# INSECTS OF MICRONESIA
# Diptera: Syrphidae[1]

By **TOKUICHI SHIRAKI**

20, 2-CHOME, NAGASAKI
TOSHIMA-KU, TOKYO, JAPAN

## INTRODUCTION

This is the first study of Syrphidae from Micronesia. Only one species, *Graptomyza uchiyamai* Shiraki, has been recorded previously from the region. In this present collection, I have found 27 species, of which 18 are new and the remainder are rather widely distributed. The latter are largely from the Oriental and Australasian Regions; a few are Palaearctic species.

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The following abbreviations are used to indicate institutions in which specimens are deposited: US (United States National Museum), BISHOP (B. P. Bishop Museum), CM (Chicago Natural History Museum), and KU (Kyushu University).

## SYSTEMATICS

### KEY TO MICRONESIAN SUBFAMILIES OF SYRPHIDAE

1. $R_{4+5}$ straight or sinuous, not bending deeply into first posterior cell ($R_5$); marginal cell ($R_1$) open (fig. 2, *a*), barely closed in *Ischiodon* (fig. 1, *a*)..........2
   $R_{4+5}$ bending deeply into first posterior cell; marginal cell closed (fig. 16, *a*) ..........**Eristalinae**

2(1). Anterior cross vein (r-m) clearly before middle of discal cell (fig. 1, *a*)..........3
   Anterior cross vein near or beyond middle of discal cell (fig. 8, *a*)..........6

3(2). Antennal segment 3 elongate, more than twice as long as wide (fig. 9, *g*)..........4
   Antennal segment 3 twice or less as long as wide (figs. 1, *i*; 6, *g*)..........5

4(3). Spurious vein (between R and M) well developed; scutellum without concavity ..........**Microdontinae**
   Spurious vein absent; scutellum with dorsal concavity..........**Graptomyzinae**

[1] Representing in part, Results of Professor T. Esaki's Micronesian Expeditions (1936-1940), No. 119.

## Distributional List of Micronesian Syrphidae

| | Micronesian Island Groups | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Caroline | | | | | | | | | |
| | Bonin | Volcano | N. Mariana | S. Mariana | Palau | Yap | Caroline Atolls | Truk | Ponape | Kusaie | Wake | Marshall | Gilbert | Other Localities |
| Syrphinae | | | | | | | | | | | | | | |
| 1. Ischiodon scutellaris | × | × | × | × | × | × | × | × | × | × | × | × | × | India, Oriental tropics and subtropics, Japan, Johnston I. |
| 2. Epistrophe citronella* | | | | | × | | | | × | | | | | |
| 3. E. septemvittata* | | | | × | | | | | | | | | | |
| 4. E. fasciata* | | | | × | | | | | | | | | | |
| 5. E. longulus* | | | | × | | | | | | | | | | |
| 6. E. magnicornis* | | | | × | | | | | | | | | | |
| 7. E. balteatus | × | | | | | | | | | | | | | Europe, Asia, North Africa |
| Bacchinae | | | | | | | | | | | | | | |
| 8. Baccha apicalis | × | | | | | | | | | | | | | Japan, Oriental Region |
| Microdontinae | | | | | | | | | | | | | | |
| 9. Microdon purpurescens* | | | | | | | | | × | | | | | |
| Eumerinae | | | | | | | | | | | | | | |
| 10. Eumerus guamensis* | | | | × | | | | | | | | | | |
| Graptomyzinae | | | | | | | | | | | | | | |
| 11. Graptomyza minor* | | | | | × | | | | | | | | | |
| 12. G. oceanica* | | | | | | | × | | | | | | | |
| 13. G. uchiyamai | | | | | × | | × | | | | | | | |
| Xylotinae | | | | | | | | | | | | | | |
| 14. Xylota boninensis* | × | | | | | | | | | | | | | |
| 15. Syritta orientalis | × | | | × | × | × | | × | × | | | | | India, Malay, Java, New Zealand, Formosa, Hawaii |
| 16. S. snyderi* | × | | | | | | | | | | | | | |
| Eristalinae | | | | | | | | | | | | | | |
| 17. Eristalis calliphoroidea* | | | | | × | × | × | × | | | | × | | |
| 18. Lathyrophthalmus lutescens* | | | | | × | | | × | | | | | | |
| 19. L. viridescens* | | | | | × | | | | | | | | | |
| 20. L. suavissimus | | | | | × | | | | | | | | × | New Guinea, Malay Archipelago |
| 21. L. arvorum | | | | × | × | | | | | | | | × | China, Malay, Java, India, Formosa, Ryukyu |
| 22. L. aeneus | | | | | | | | | | | | | × | Europe, North Africa, North America, Persia, Canary Is. |
| 23. Axona chalcopyga | | | | | × | | | | | | | | | Malay Archipelago, New Guinea, Philippines |
| 24. Dissoptera clarkei* | | | | | | | | | | × | | | | |
| 25. D. gressitti* | | | | | | | × | | | | | | | |
| 26. D. yapensis* | | | | | | × | | | | | | | | |
| 27. D. palauensis | | | | | × | | | | | | | | | |
| 28. Metasyrphus fasciatus* | | | | | | | | | | | | | | Johnston I. |

* Described as new.

5(3). Abdomen elongate, narrowed basally........ **Bacchinae**
Abdomen oval, not narrowed basally........ **Syrphinae**

6(2). Apical cross vein ($M_{1+2}$) strongly recurved and with stump vein at angle ........ **Eumerinae**
Apical cross vein not strongly recurved and without stump vein........ **Zeliminae**

## Subfamily Syrphinae

Small to large, mostly with pale markings on head, thorax, and abdomen. Antenna shorter than head, drooping; arista dorsal, bare or at most moderately pubescent but never plumose. Face normal, with or without median callus, slightly hollowed or not below antennae, almost retreating to oral margin but in a few genera produced forward at epistoma; frons swollen or normal; oral opening long or oval; eyes bare or pubescent, usually touching in male. Mesonotum and scutellum somewhat punctate or not; humeri and area between them bare, although in some instances there may be a few hairs upon posterior edge of humeri. Abdomen not punctate or petiolate, consisting of five visible segments exclusive of genitalia in both sexes, oval or parallel-sided, lateral margins being ridged or not and directed downward or horizontally. Anterior cross vein distinctly before middle of discal cell, almost always perpendicular; third longitudinal vein usually rather straight or moderately curved, without a veinlet toward subapical cell; marginal cell open (barely closed in *Ischiodon*); subapical cell almost always pointed at apical angle; 1 A (anal spurious vein) normal; stigmal cross vein absent. Legs normal; femora simple, without basal patches of setae; hind tibiae almost always straight, slender, simple, their ends transverse.

In Micronesia, seven species in two genera are included in the Syrphinae.

### Key to Micronesian Genera and Species of Syrphinae

1. Tergite 2 with yellow spot or band on each side, which is interrupted in center by black or brown band........ 2
Tergite 2 with yellow band continuing across segment without interruption........ 6

2(1). Antennal segment 3 oblong, clearly longer than wide (fig. 1, *i*)........ 3
Antennal segment 3 oval, scarcely longer than wide (fig. 3, *h*)........ 4

3(2). Mesopleuron yellow posteriorly; lateral margins of mesonotum broadly yellow; male with spur on ventral surface of hind trochanter........ **1. Ischiodon scutellaris**
Mesopleuron waxy white posteriorly; lateral margins of mesonotum narrowly grayish yellow; male unknown........ **6. Epistrophe magnicornis**

4(2). Mesonotum rather slender, about 1.5 times as long as wide........ 5
Mesonotum little longer than wide........ **3. E. septemvittata**

5(4). Abdomen metallic aeneous black, yellow bands on abdomen very narrow, that on tergite 2 narrower than anterior black band........ **5. E. longulus**
Abdomen metallic purplish black, yellow bands of abdomen moderately wide, that on tergite 2 about as wide as anterior brown band........ **4. E. fasciatus**

(6)1. Mesonotum without well-defined yellow stripes; sub-basal brown band on tergite 2 expanded in center; frons with brown spot above base of each antenna........ **7. E. balteatus**
Mesonotum with well-defined lateral yellow stripes; sub-basal brown band on tergite 2 with small median impression, apical band with sharp median projection; frons of male with single brown spot above antenna, female with wide black band........ **2. E. citronella**

## Genus **Ischiodon** Sack

*Ischiodon* Sack, 1913, Ent. Mitt. **2**: 5.

This genus is quite distinct and can be recognized by vein $R_1$ reaching tip of costa (or tip of $R_{2+3}$ in *scutellaris*) and hind trochanter of male bearing a characteristic spur.

### 1. **Ischiodon scutellaris** (Fabricius). (Figure 1.)

*Scaeva scutellaris* Fabricius, 1805, Syst. Antliatorum, 252.

*Syrphus nasutus* Macquart, 1842, Dipt. Exot. 2 (1): 89, pl. 16, fig. 6.

*Syrphus splendens* Doleschall, 1856, Nat. Tijd. Ned. Ind. **10**: 410, pl. 1, fig. 3.

*Melithreptus novae-guineae* Kertész, 1899, Term. Füzetek **22**: 178, fig. 3.

*Ischiodon trochanterica* Sack, 1913, Ent. Mitt. **2**: 6.

*Melithreptus ogasawarensis* Matsumura, 1916, Ent. Mag. Jap. **2** (1): 23, pl. 1, fig. 17.

*Male:* Head broader than thorax, about 2.1 times as wide as long and twice as high as long, eyes contiguous for barely half distance from lunule to tip of vertical triangle, which is black with sparse fine blackish pubescence and hardly elevated; frons bright sulphur yellow with yellowish pubescence, in middle a rather distinct longitudinal sulcus, eye margins divergent at right angles, apical margin well emarginated; lunule distinctly sunken, shining yellowish. Face conspicuously longer than wide, slightly narrowed beneath with more or less straight lateral margins, shining yellow, but sometimes with a brownish spot on lower portion of central knob, with some pale microscopic pubescence; in profile showing only slightest concavity above rather large central knob, which reaches directly to upper mouth edge; epistoma very small, brownish; proboscis blackish. Back of head slightly hollowed, black; orbits distinctly yellowish, lateral portion white tomentose and pubescent, upper portion yellowish pubescent; genae very narrow, sulphur yellow, with yellowish pubescence. Eyes blackish brown, only the most frontal facets a little larger than rest, kidney-shaped in profile with both upper and lower angles similarly rounded. Antennae placed distinctly above middle of eye, yellow to brownish orange; segments 1 and 2 usually blackish brown dorsally, with some tiny black bristles; segment 1 comparatively long, segment 2 very short, segment 3 nearly twice as long as wide, more or less brownish on upper side and at round tip, gradually narrowed apically. Arista shorter than segment 3, yellow with tip blackish, quite bare.

Mesonotum distinctly longer than wide, shining aeneous black, clothed with a dense erect brown pubescence, but on lateral yellow parts pubescence is dense, long, yellowish, lateral margins more or less broadly orange yellow to yellow from notopleura to behind wing bases, where color narrows and disappears; notopleura light yellow to brownish yellow, with some yellowish pubescence; postalar calli brown, with brown pubescence. Scutellum about twice as wide as long, yellow to orange yellow, center almost always largely brown to blackish brown, clothed with brownish erect pubescence, which becomes distinctly longer and yellowish along posterior margin. Pleuron shining black, with a large median ivory-yellow callus from top to bottom of mesopleuron, contiguous to a similar horizontal oval callus on the sternopleuron, both spots clothed with long, yellow or orange-yellow pubescence; metapleuron with a yellowish upper longitudinal carina furnished with dense white pubescence; pteropleuron with sparse long radiating yellow pubescence on upper half; both stigmas yellowish white; metanotum and metaphragma shining black.

Abdomen almost parallel-sided, about 1.5 times as long as head and thorax combined, distinctly margined, moderately shining black, usually becoming gradually paler

toward apex, covered with very fine pubescence which becomes longer at sides of first two segments; tergite 1 with a small yellowish spot on each side; tergite 2 with a large sulphur-yellow spot on each side, each spot narrowed and rounded on its inner end; spots vary a little in width, median black line sometimes being very narrow or indefinite; tergites 3 and 4 each with a broad orange-yellow band reaching sides, slightly arcuated and generally very slightly narrowed in middle, especially that on tergite 4, sometimes interrupted by a narrow blackish median stripe on tergite 4;

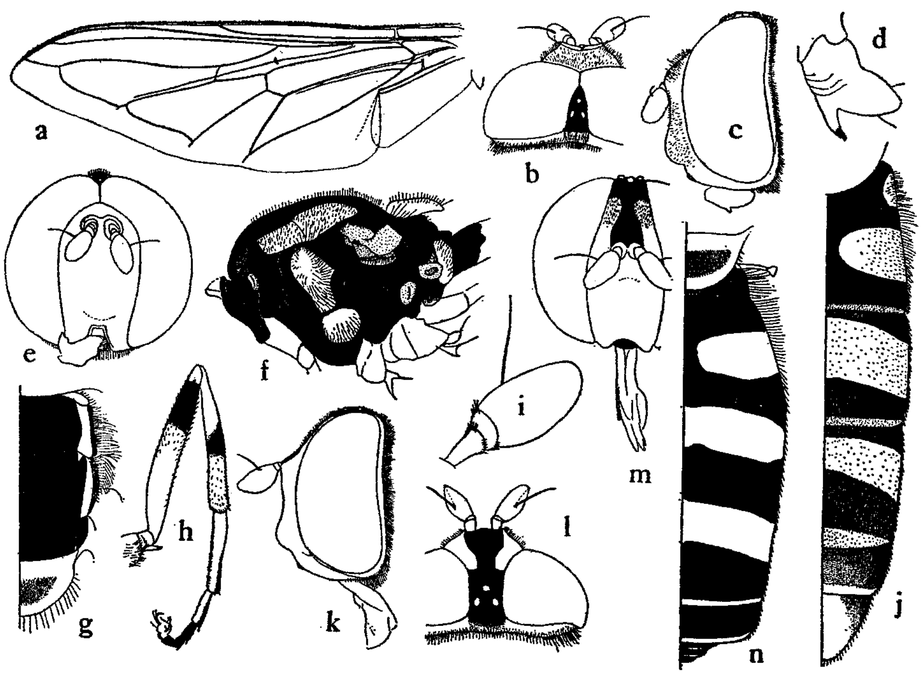



FIGURE 1.—*Ischiodon scutellaris*. **a-j**, male: *a*, left wing; *b*, head, dorsal view; *c*, head, lateral view; *d*, hind trochanter, inner side; *e*, head, frontal view; *f*, thorax, lateral view; *g*, thorax, dorsal view; *h*, hind leg, outer side; *i*, antenna, outer side; *j*, abdomen, dorsal view. **k-n**, female: *k*, head, lateral view; *l*, head, dorsal view; *m*, head, frontal view; *n*, abdomen, dorsal view.

bands placed very near anterior margin, leaving base very narrowly blackish and hind margin more broadly so, though occasionally extreme hind margin may be pale. Tergite 5 blackish to brownish, orange along posterior margin, or sometimes mostly orange yellow; pygidium comparatively large, yellowish brown to blackish, bearing large, reddish-yellow to brownish-yellow genitalia on the underside.

Wing pellucid, little longer than abdomen; $R_1$ reaching tip of costa or $R_{2+3}$; $R_{4+5}$ moderately sinuate; r-m oblique, nearer middle than base of discal cell; vena spuria well developed, barely reaching apex of discal cell; 1 A (first anal, so-called anal spurious vein) well developed, nearly reaching upper angle of so-called anal cell. Squamae large, yellowish white, with orange-yellow margins and long yellowish fringes; halter dull yellow, sometimes with brownish-yellow head.

Legs reddish yellow, moderate in length. Anterior leg with four apical tarsal segments brownish; tarsus of front leg conspicuously short and more or less broader than

that of mid leg. Hind leg longest; femur blackish brown to black on apical one-third, apex yellowish, on apical half of underside some long brown bristly hairs; tibia distinctly shorter than femur, with an indefinite median brown ring; metatarsus half as long as tibia and about as long as four apical segments taken together, brownish on apical part of dorsal side; four apical tarsal segments brown to black, except on underside; trochanter usually more or less brownish, about twice as long as wide, a conspicuous spur with black bristly pubescence on middle of inner-ventral side.

*Female:* Frons with a large square black spot on vertex from eye to eye, and a median, gradually widening, black or brown longitudinal stripe of varying width extending from spot to two small shining black lunular calli, barely raised above level of frons. Abdomen almost always darker than in male, and yellow markings conspicuous; segments 5 and 6 black, with posterior and lateral margins yellowish; remaining segments blackish or brownish. Dark parts of legs rather paler and smaller than in male; hind trochanter without spine.

Length 7-11 mm.; wing length 4.5-6.8 mm.

DISTRIBUTION: India, Malaya, Formosa, Ryukyus, Japan, Micronesia, Johnston I.

BONIN IS. CHICHI JIMA: Six, Omura, Apr., May-June, 1958, Snyder; two, Miyanohama, Apr. 1958, Snyder, Aug. 1934, Okabe; one, Muko I., July 1951, R. Bohart; one, Ototo Jima, Kammuri-iwa, June 1958, Snyder; one, Minami Jima, "Long I.," May 1958, Snyder.

VOLCANO IS. IWO JIMA: Two, Sept. 1945, Dybas.

N. MARIANA IS. AGRIHAN: Nine, June 1952, July 1951, Aug. 1945, R. Bohart, Borror.

S. MARIANA IS. SAIPAN: Three, June 1946, Oakley, Nov. 1944, Hagen; two, Achugau area, Jan. 1945, Dybas; two, in latrine, Sept. 1944. ROTA: Five, July 1925, Hornbostel. AGIGUAN: Two, June 1952, Owen. GUAM: Three, Pt. Oca, Mar., June 1945, G. Bohart; one, near Harmon Field, Jan. 1949, Baker; 10, Piti, July 1937, Oakley; two, "Com. Mar. Hill," Dec. 1948, Maehler; one, Yigo, Oct. 1957, Krauss; one, Tumon Bay, May 1945; two, Talofofo, Apr. 1946, Aug. 1952, Krauss; two, Pt. Ritidian, June 1945, Bohart and Gressitt; one, southeast coast, May 1945, Gressitt; one, Mt. Alifan, Apr. 1946, Krauss; Mt. Santa Rosa, May 1945, G. Bohart; one, Pago, May 1945, Bohart and Gressitt; one, near Yona, Oct. 1957, Krauss; six, no data, Bohart, Fullaway.

PALAU. KOROR: Eight, Jan. 1954, Beardsley, Mar. 1948, Maehler, Sept. 1952, Krauss. BABELTHUAP: Three, Ngerehelong, May 1957, Sabrosky; one, Ngiwal, May 1957, Sabrosky. PELELIU: Two, July 1946, Townes. ANGAUR: One, Dec. 1949, Owen.

YAP. YAP: Three, Kolonia, Mar. 1954, Beardsley, July-Aug. 1950, Goss; two, Ruul Distr., July-Aug. 1950, Goss; one, S. Yap I., July-Aug. 1950, Goss; one, Mt. Matade, 60 m., Dec. 1952, Gressitt; one, Giliman, June 1957, Sabrosky; one, near Yaptown, July 1946, Townes. MAP: One, July-Aug. 1950, Goss.

CAROLINE ATOLLS. LAMOTREK: One, Feb. 1953, Beardsley. LUKUNOR: Two, Nov. 1952, Oct. 1953, Beardsley. IFALUK: Three, beating weeds,

*Wedelia,* Sept. 1953, M. Bates. NUKUORO: Aug. 1946, Townes. KAPINGAMARANGI: One, Nunukita I., in grass, *Stenotaphrum, Asplenium,* Aug. 1954, Niering. FARAULEP: One, Feb. 1953, Beardsley. SOROL: Two, Sept., Oct. 1952, Krauss. NOMWIN: Two, Feb. 1954, Beardsley. WOLEAI: One, Falalis I., Feb. 1953, Beardsley.

PONAPE. Two, Colonia, Mar. 1948, Dybas, July 1949, Owen; one, Mt. Peipalap, June-Sept. 1950, Adams; one, Ronkiti, Feb. 1936, Ono; one, Nett Distr., Nanpil, Feb. 1948, Dybas.

KUSAIE. Two, Funaunpes, 1 m., Jan., Mar. 1953, Clarke; one, Mutunlik, Apr. 1953, Clarke; two, Lele, Aug. 1946, Townes.

TRUK. WENA (Moen): 33, Civ. Ad. Area, Feb.-Apr. 1949, Potts; four, Jan.-Feb. 1948 (intercepted in Hawaii), M. Ross. PIS: One, June 1946, Townes. FEFAN: One, May 1946, Townes. UTOT (Udot): One, May 1946, Townes. TON (Tol): Two, May 1946, Townes. TONOAS (Dublon): One, Feb. 1948, Maehler.

MARCUS. One, June 1952, Sakagami.

WAKE. One, Nov. 1953, Joyce; Peale I., July 1940, *Cordia,* T. Lyons.

MARSHALL IS. ENIWETOK: Two, sweeping *Scaevola,* Jan. 1951, Oshiro; one, no. 863, Fosberg; Eniwetok I., nine, May 1946, Oakley and Townes; Nov. 1944, Dybas; Japtan I., Jan. 1957, Tuthill. NAMU: Oct. 1953, Beardsley. KWAJALEIN: One, Feb. 1958, Krauss; three, Mar. 1953, Clagg; three, Apr. 1948, *Scaevola,* one, Apr. 1949, Maehler; two, Aug. 1946, Townes; two, Nov. 1946, L. K. Jones. LIKIEP: Two, Aug. 1946, Townes. MAJURO: Two, Aug. 1946, Townes; one, Rongrong (Roguron), Apr. 1949, Maehler; one, Telap (Dalap), Apr. 1949, Maehler; four, Ulika (Uliga), Sept., Nov. 1953, Beardsley. JALUIT: Four, Aug. 1946, Townes. NAMORIK: Four, Sept.-Oct. 1953, Beardsley. LIB: Two, Oct. 1952, Beardsley.

GILBERT IS. TARAWA: One, Bikenibeu, Nov. 1957, one, Teaoraereke, Nov. 1957, one, Bairiki, Nov. 1957, one, Marenanuka, Dec. 1957, one, Banraeba, Dec. 1957; all by Krauss. ONOTOA: Three, Buiartun, around *Messerschmidia,* July 1951, Moul.

JOHNSTON I.: One, Dec. 1947, Maehler.

## Genus **Epistrophe** Walker

*Epistrophe* Walker, 1852, Ins. Saundersiana, Dipt. **1**: 242.

Slender, mostly small species; with bright markings characteristic of *Syrphus* and with lateral margins of abdomen down-rolled, never emarginated; metasternum (epimeron) hairy.

Of the six species of *Epistrophe* here recorded from Micronesia, one is widely distributed in Europe, Asia, North Africa and other regions, and five are described as new.

**2. Epistrophe citronella** Shiraki, n. sp. (fig. 2).

Rather small species, with all abdominal bands complete, not interrupted.

*Male:* Head distinctly broader than thorax, about 1.8 times as wide as long and nearly as high as wide. Eyes occupying median one-third of frons; anterior frontal portion light yellow, clothed with yellowish pubescence, comparatively broad, posterior angle at right angles with straight lateral margins; posterior frontal portion (vertex) well elevated, shining black, with sparse, brown pubescence; ocelli very small, median one distant from lateral ocelli about twice distance of latter; lunule shining black, roundish. Face waxy light yellow, furnished with very fine and rather inconspicuous yellowish pubescence, distinctly longer than wide, with lateral margins more or less curved outward, and somewhat decreasing in width from antennae to oral margin; central knob comparatively large; epistoma light yellow. Back of head well hollowed, black, covered with grayish dust and with yellowish-brown pubescence; lower portion covered with whitish dust and with paler pubescence. Eyes bare; in profile kidney-shaped, nearly reaching oral margin, about 1.8 times as high as long. Antenna rather small, orange yellow, with tip more or less blackish; basal segments bearing some yellowish-brown pubescence; segment 3 a little longer than wide, apical margin evenly rounded; arista rather short, quite bare, blackish following thick yellowish basal half.

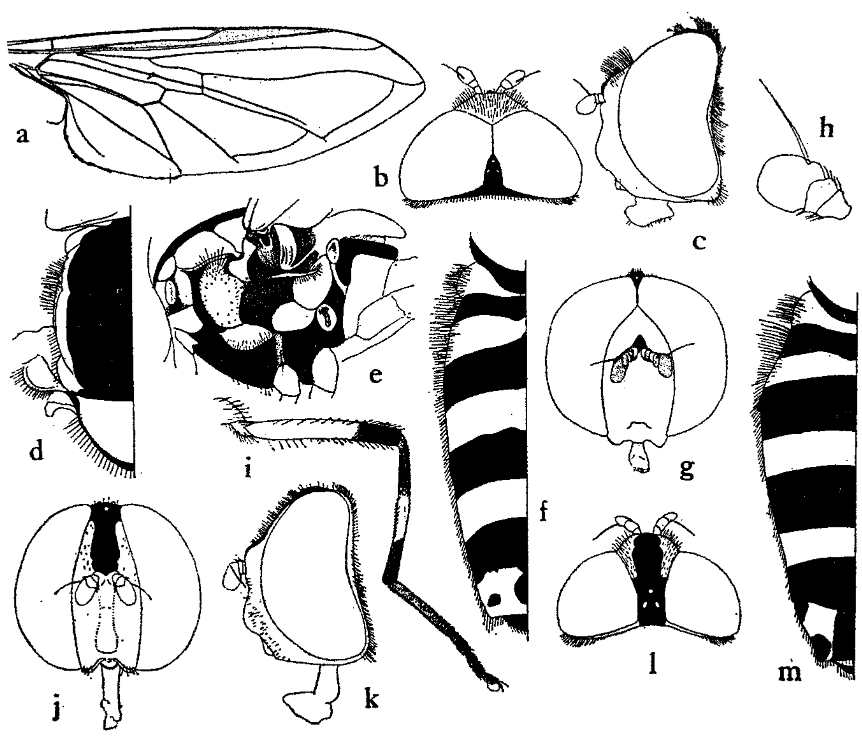



FIGURE 2.—*Epistrophe citronella.* **a-i,** male: *a,* right wing; *b,* head, dorsal view; *c,* head, lateral view; *d,* thorax, dorsal view; *e,* thorax, lateral view; *f,* abdomen, dorsal view; *g,* head, frontal view; *h,* antenna, inner side; *i,* hind leg, outer side. **j-m,** female: *j,* head, frontal view; *k,* head, lateral view; *l,* head, dorsal view; *m,* abdomen, dorsal view.

Mesonotum nearly 1.2 times as long as wide, shining deep black with rather narrow conspicuous yellow lateral stripes from humeri to postalar calli, along posterior margin a distinct, dull grayish-black, narrow, transverse band, clothed with erect, yellowish-brown pubescence; scutellum 1.6 times as wide as long, citron yellow, clothed with black, erect, rather long pubescence which becomes longer along posterior marginal border. Pleura shining black, very sparsely pubescent; mesopleuron citron yellow leaving anterior border, furnished with long yellow pubescence; sternopleuron with a large citron-yellow callus at upper part, callus with rather dense, yellowish pubescence; pteropleuron at anterodorsal part with long yellow radiating pile; metapleuron with two large citron-yellow calli; first stigma yellowish, second stigma orange yellow and its upper part finely pubescent.

Abdomen conspicuously longer than head and thorax together, as wide as thorax, dull black with broad citron-yellow bands, clothed with minute erect blackish pubescence; tergite 1 shining citron yellow, with extreme posterior margin black, lateral parts furnished with long yellowish hairs; tergite 2 with a narrow, brownish-black band along anterior margin and just before posterior margin, citron-yellow, median transverse band conspicuously narrowed at middle and more or less produced forward, lateral part furnished with long yellowish hairs; tergite 3 with two brownish bands similar to those of tergite 2, median citron-yellow band same width throughout, slightly curved forward so that its median anterior margin is placed very near to posterior margin of preceding segment and its posterior margin at about center of this segment; tergite 4 with two brownish bands as in two preceding segments but hind marginal one conspicuously broad, citron-yellow band more curved forward; segment 5 orange yellow, yellowish pubescent, with five black spots, of which median one is largest, bottle-shaped, extending from anterior margin to front of posterior margin, and two lateral pairs small and roundish, the posterior one not touching lateral margin; hypopygium brownish black, with left half yellowish.

Wings pellucid, with subcostal cell very slightly smoked, no distinct pterostigma; $R_{4+5}$ slightly sinuate; r-m straight and slightly oblique, slightly nearer to base of discal cell than to its middle; spurious vein well developed and extending to apical angle of discal cell; 1 A also well developed, extending to lower angle of so-called anal cell; squamae dark gray; halter orange yellow.

Legs slender and long, citron yellow, with tarsi more or less brownish, claws blackish. Hind femur with apical third blackish, rather sparsely covered with black pubescence which becomes longer on under surface and apical upper side; hind tibia nearly as long as femur, blackish with middle one-third yellowish, black pubescent; hind metatarsus as long as one-half of tibia, longer than four following segments taken together, reddish brown; remaining tarsal segments more or less darkened.

Length 8.5 mm.; wing length 6 mm.

*Female:* Frons one-seventh as wide as head, distinctly broadened forward, with vertical part parallel-sided, black, with lateral parts of apical half orange yellow, clothed with short, erect, yellowish pubescence; lunule shining black. Face shining orange yellow, yellowish pubescent, slightly narrowed beneath, conspicuously longer than wide; epistoma orange yellow. Abdomen slightly broader than thorax, transverse bands more or less differing from those in male; yellow band of tergite 2 never produced forward in middle, but its anterior margin distinctly incised in middle; yellow bands of tergites 3 and 4 less curved than in male; black spots of tergite 5 large, especially the median one which extends to posterior margin of this segment; tergite 6 deep shining black.

Length 9.5 mm.; wing length 7.1 mm.

Holotype, male (US 66512), Koror, Palau Is., Dec. 30, 1953, Beardsley; allotype, female, Koror, Palau Is., March 1954, Beardsley. Paratypes: male, Koror, Palau Is., Dec. 30, 1953, one reared ex pupa on leaf infested with *Ferrisiana* and *Steatococcus;* female, Koror, Palau Is., Dec. 5, 1947, Dybas; female,

south of Nanponmal, Ponape, Jan. 17, 1953, Clarke; Aug. 8, 9, 1946, Townes; July 8, 1949, collector unknown.

DISTRIBUTION: Caroline Is. (Palau, Ponape).

This new species is distantly related to the African species *Xanthogramma pfeifferi* Bigot, but is easily distinguished by the abdominal markings; from other species of *Xanthogramma* it differs in the less emarginated lateral margin of the abdomen and in the abdominal pattern.

**3. Epistrophe septemvittata** Shiraki, n. sp. (fig. 3, *a-h*).

Small, elongate, metallic-colored species.

*Female:* Head distinctly wider than thorax, 1.9 times as wide as long and a little wider than high; frons slightly elevated above eyes, but moderately hollowed in front of ocellar triangle, nearly one-seventh as wide as head, conspicuously broadened apically, vertical area parallel-sided, metallic aeneous black, covered with fine erect yel-

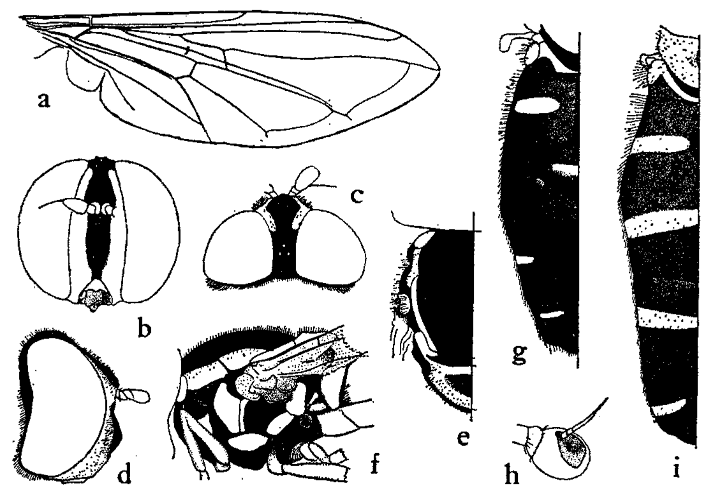



FIGURE 3.—**a-h**, *Epistrophe septemvittata*, female: *a*, right wing; *b*, head, frontal view; *c*, head, dorsal view; *d*, head, lateral view; *e*, thorax, dorsal view; *f*, thorax, lateral view; *g*, abdomen, dorsal view; *h*, antenna, outer side. **i**, *E. fasciata*, female, abdomen, dorsal view.

lowish pubescence, on apical half a pair of yellow stripes along lateral margins extends to sides of face; ocellar triangle poorly defined; face wider than one-third of head width, a little longer than wide, somewhat parallel-sided, slightly hollowed beneath antennae, below which is a large moderate central knob, from there face recedes a little to upper mouth edge; waxy yellow, with a broad, shining, brownish-black central stripe which distinctly narrows just above epistomal margin, very fine pubescent; genae slightly developed beneath eye, slightly pubescent; back of head distinctly hollowed, black, with much yellowish pile on lower half. Eyes quite bare, in profile kidney-shaped, posterior margin moderately incurved, upper and lower angles similarly rounded, 1.8 times as long as wide. Antenna yellowish, short; segment 3 round, nearly as wide

as long, apicodorsal portion of outer side with a characteristic, large dark area, short bare arista at base.

Mesonotum metallic bluish black, with conspicuous yellow lateral stripes extending from humeri to postalar calli, covered with fine erect blackish pubescence; humeri rather small, yellow, no distinct long seta; postalar calli yellow, conspicuously elevated, moderately pubescent; scutellum somewhat triangular, yellow, median area brownish, covered with fine erect, blackish pubescence, along posterior marginal border many short black bristly setae; postnotum black; pleura metallic black with more or less greenish brilliance, upper area of proepimeron, mesoepisternum, upper half of sternopleuron, metaepisternum and upper area of hypopleuron ivory yellow; first stigma slitlike, yellowish white, second stigma round, yellowish, furnished with fine whitish pubescence around opening.

Abdomen distinctly longer than head and thorax together, not broader than thorax, metallic purplish black, covered with black, partly depressed, fine pubescence; segment 1 yellow, one pair of large triangular brown spots along posterior margin; segment 2 reddish brown with pair of short yellow bands not meeting in center; segment 3 reddish brown with a short, reddish-yellow, median crescent band just before middle, posterior margin of band darker than central part, but lateral parts intermediate in color between other parts; segment 4 with a pair of narrow, lateral, yellow, bandlike spots just before middle, which nearly touch lateral margin; segment 5 near base with a pair of narrow, oblique, yellow, bandlike spots which do not reach lateral margin; terminalia pale apically.

Wing distinctly shorter than thorax and abdomen taken together, 3.2 times as long as wide, pterostigma slightly smoky; halter light yellow, with orange-yellow head.

Legs yellow except for brown on dorsal surface of fore and mid tibiae; fore and mid femora with many erect, rather long, black setae along posterior side; hind leg brown on apical half of femur, basal and apical thirds of tibia and tarsus; femur with black on anterior surface.

Length 7.2 mm.; wing length 6.1 mm.

*Male:* Unknown.

Holotype, female (CM), Tinian, Marianas, March 25, 1945, Dybas; paratype, female, Agiguan, June 7, 1952, Peterson.

DISTRIBUTION: S. Mariana Is.

This new species is quite distinct from other known species of *Epistrophe* in that the mesonotum has distinct lateral yellow stripes as in *Xanthogramma.*

### 4. **Epistrophe fasciata** Shiraki, n. sp. (fig. 3, *i*).

*Female:* Distinct from preceding species in the longer mesonotum and yellow pattern of abdomen: segment 3 with broad transverse band just before middle which is slightly curved forward and very slightly narrowed medially; segment 4 distinctly before middle with a transverse band parallel to anterior margin of segment and slightly narrowed medially; segment 5 with a pair of oblique, lateral, narrower, bandlike spots.

Length 9 mm.; wing length 7.2 mm.

*Male:* Unknown.

Holotype, female (BISHOP 2743), Agiguan Is., Marianas, June 7, 1952, Kondo.

DISTRIBUTION: S. Mariana Is. (Agiguan).

### 5. **Epistrophe longulus** Shiraki, n. sp. (fig. 4).

Small, elongate, metallic-colored species, with relatively long mesonotum.

*Female:* Head distinctly wider than thorax, 1.4 times as wide as long and nearly as wide as high. Frons a little wider than one-sixth of head width, conspicuously

broadened apically, vertical portion parallel-sided, metallic purplish black, covered with fine, erect blackish pubescence, on apical half a pair of yellow lateral streaks along eye margins, extending onto face as far as genae. Face about one-third as wide as head and distinctly higher than wide, very slightly narrowed beneath, hardly hollowed beneath antennae, below which is a large moderate central knob, thence face recedes to the upper mouth edge, yellow, with a broad shining purplish-black median stripe which becomes distinctly narrow just above epistomal margin, very fine yellowish pubescence on yellow portions; genae very slightly produced beneath eyes, yellowish pubescent. Back of head distinctly hollowed, black, with very narrow yellowish

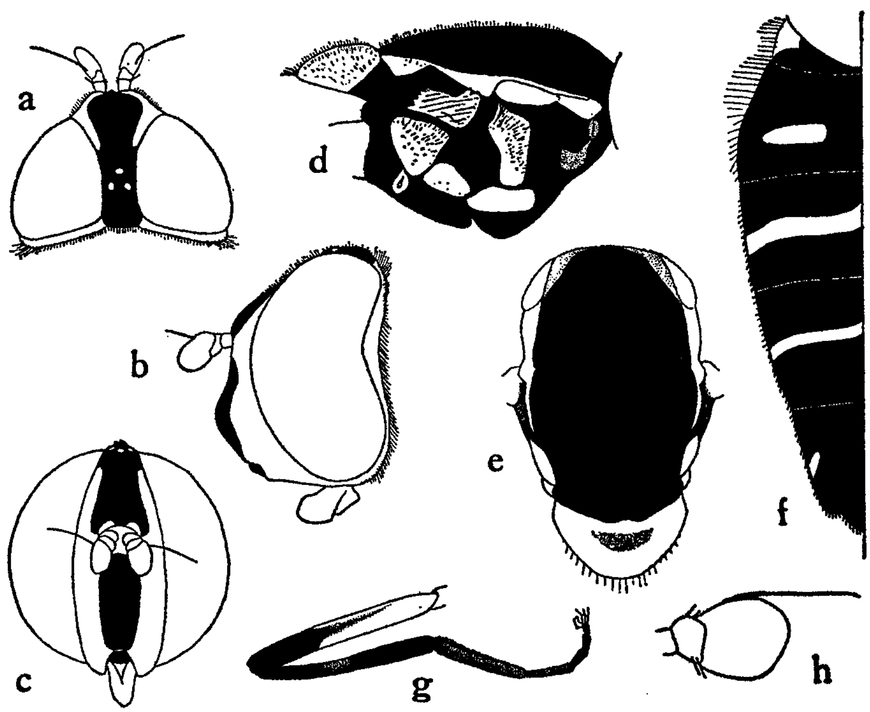



FIGURE 4.—*Epistrophe longulus,* female: **a**, head, dorsal view; **b**, head, lateral view; **c**, head, frontal view; **d**, thorax, lateral view; **e**, thorax, dorsal view; **f**, abdomen, dorsal view of left half; **g**, hind leg, outer side; **h**, antenna, inner side.

orbits, latter furnished with whitish hairs which become very short and blackish on upper parts. Eyes quite bare, in profile kidney-shaped, posterior margin distinctly hollowed, upper rounded angle a little smaller than lower rounded angle, one-half as wide as long. Antenna blackish, with segment 2 and lower half of segment 3 yellowish, short; segment 3 roundish, a little longer than wide, moderately narrowed basally; arista brown, short, and bare, nearer base of segment 3 than to apex.

Mesonotum 1.6 times as long as wide, metallic bluish black, with conspicuous but narrow yellow lateral stripes extending from inner sides of humeri to postalar calli, covered with a fine, erect blackish pubescence; humeri moderate in size, yellow, with-

out distinct pubescence; postalar calli yellow, distinctly elevated, yellowish pubescent. Scutellum relatively large and distinctly narrowed apically, yellow, with small brownish median area, covered with a blackish erect pubescence which becomes distinctly longer along posterior margin; postnotum metallic aeneous black. Pleura shining black, with five yellow calli: a small one below first stigma, one on mesopleuron, one on upper half of sternopleuron, a large triangular one above second stigma, and one on hypopleuron.

Abdomen a little longer than head and thorax together, broader than thorax at second segment, then gradually narrowed posteriorly, metallic aeneous black, covered with a somewhat depressed fine black pubescence; segment 1 with a pair of narrow yellow laterobasal spots; segment 2 with a pair of narrow yellow transverse spots just behind middle; segment 3 with a narrow yellow transverse, somewhat sinuate band at middle; segment 4 with a similar but narrower band; segment 5 with a pair of very small yellowish lateral oblique spots.

Wing nearly as long as thorax and abdomen together, about one-third as wide as long, very slightly fumose but costal cell quite hyaline, pterostigma light brown; pteralia blackish; squamae grayish brown, with blackish margins; halter orange yellow.

Legs slender, two anterior pairs orange yellow with tarsi brown on dorsal surfaces; hind trochanter blackish; hind femur yellowish, apical third black, from this black portion to near base along externodorsal surface brownish; hind tibia dull black with an indistinct brownish ring just before middle; hind tarsus brownish black.

Length 7.5 mm.; wing length 6.5 mm.

*Male:* Unknown.

Holotype, female (US 66513), Haputo Pt., Guam, Apr. 7, 1948, Maehler. Paratype, female (BISHOP), near Haputo Pt., Guam, Feb. 2, 1948, Maehler.

DISTRIBUTION: S. Mariana Is. (Guam).

*E. longulus* is allied to *E. septemvittata,* but differs from the latter in the relatively long mesonotum, the abdominal pattern, and other characters.

### 6. **Epistrophe magnicornis** Shiraki, n. sp. (fig. 5).

Small black species with large antennal segment 3 and yellow abdominal bands.

*Female:* Head wider than thorax, distinctly wider than long and slightly higher than wide. Frons one-fifth as wide as head, vertical part parallel-sided and then conspicuously broadened forward, shining bluish black, anterior lateral portions yellowish contiguous to waxy pale yellow face, covered with fine yellowish pubescence except on black portion where it is blackish and very short; ocellar triangle more or less conspicuous, with small equidistant ocelli. Face waxy pale yellow without black stripe, nearly one-third as wide as head, distinctly narrowed beneath, hardly hollowed beneath antennae, below antennae a moderate central knob; from there face conspicuously recedes to upper mouth edge, yellowish micropubescent at lateral borders; genae hardly produced beneath eyes. Back of head hollowed, black; orbits narrow but distinct, grayish white, furnished with white short hairs which become yellowish and finer on upper portion. Eyes quite bare, in profile posterior margin very slightly concave, gradually broadened beneath. Antenna relatively long, brownish; segment 2 very short, half as long as segment 1 and nearly half as long as wide; segment 3 large and oblong, nearly half as wide as long, with a very short blackish bare arista at middle of dorsal margin.

Mesonotum relatively short, a little longer than wide, metallic black, with grayish-yellow, distinct, narrow, lateral stripes from yellowish-white humeri to narrow brownish-yellow postalar calli, covered with a fine erect brown pubescence; scutellum semicircular, blackish brown, with basal and posterior borders yellowish, yellowish pubescent; postnotum black. Pleura black, with two waxy white calli, one on mesoepisternum and one on upper portion of sternopleuron.

## Genus **Baccha** Fabricius

*Baccha* Fabricius, 1805, Syst. Antliatorum, 199.
*Bacca* Rondani, 1857, Dipt. Ital., Prodr. **2**: 104.
*Bacca* Rondani, 1844, Nuovi Ann. Sci. Nat. Bologna II, **2**: 458.
*Bacha* Schiner, 1862, Fauna Austriaca **1**: 323.
*Bacchina* Williston, 1896, Monogr. North Am. Diptera, ed. 2, 86.

Slender flies, usually petiolate, sometimes spatulate. Coloration either dark or light, or metallic. Head more than hemispherical, broader than thorax, hollowed behind; frons slightly prominent; eyes bare, holoptic in male, narrowly separated in female; antennae short, with bare dorsal arista; face usually tuberculate, sometimes not. Metasternum bare. Legs simple. Wings with venation of *Syrphus*; alulae very small or almost absent; squamae small, inconspicuous.

### 8. **Baccha apicalis** Loew (fig. 6).

*Baccha apicalis* Loew, 1858, Wiener Ent. Monatschr. **2**: 106.
*Baccha pulchrifrons* Austen, 1893, Zool. Soc. Lond., Proc., 139, pl. 4, figs. 10, 10a, 11.
*Baccha apicenotata* Brunetti, 1915, Indian Mus. Rec. **11**: 221, pl. 13, fig. 8.

*Male:* Head distinctly broader than thorax, 1.5 times as wide as long, a little broader than high. Vertex very narrow, twice as long as wide, slightly elevated, metallic aeneous black, brownish pilose; frontal triangle about 2.5 times as wide as long, metallic aeneous black, clothed with brownish tomentum and pile; antenniferous process rather large, bare, divided in two by a median sulcus, shining aeneous black, between frontal triangle and process a rather distinct transverse sulcus; lunule rather small, shining blackish brown. Face moderately narrowed beneath, central knob more or less distinct, metallic aeneous black, yellowish pilose, lateral marginal areas more or less distinctly brownish yellow pollinose; lateral oral margins distinctly yellowish. Back of head black, whitish pollinose, with a fringe of pale hairs; genae very low, black. Eyes more or less purplish black, in profile kidney-shaped, nearly 1.6 times as high as long. Antenna orange yellow, small, porrect; two basal segments conspicuously furnished with black bristly hairs along outer apical margin; segment 3 oval, nearly 1.3 times as long as wide; arista comparatively short, yellowish, with some microscopical pubescence, except apical half which is brown and quite bare.

Mesonotum distinctly longer than wide, metallic aeneous black, clothed with erect, brownish-yellow pubescence, which becomes longer on notopleura; scutellum comparatively large, color and pubescence similar to mesonotum, with sparse, distinctly long, somewhat bristly hairs along posterior margin; color and pubescence of pleura similar to that of mesonotum, but mesoepisternum furnished with long, dense whitish hairs; humeri more or less pale.

Abdomen very long and slender, about 2.2 times as long as head and thorax together, metallic aeneous black with reddish-yellow markings, clothed with long, erect whitish pile on sides of first three segments, except posterior half of third, elsewhere with rather appressed pubescence which is black on black and whitish on yellowish parts; segments 3 and 4 curled ventrally to make abdomen at tip appear not more than twice width of segment 2 at base; segment 1 aeneous black, with anterior and lateral margins yellowish; segment 2 aeneous black, with a rather faint reddish-yellow transverse band just behind middle, sometimes this band entirely obscure; segment 3 shorter than preceding one, aeneous black on basal half and purplish black on apical half, with a somewhat quadrate reddish-yellow spot on each side in middle; segment 4 shorter than preceding one, purplish black on basal half and aeneous black on apical

half, with oblique, quadrate, orange-yellow spot on each side of basal half, each spot with sharp angle projecting backward on each side of median line; segment 5 is 0.3 times as long as preceding one, aeneous black; genitalia metallic black, with pale appendages.

Legs orange yellow; coxa brown to blackish brown; apical half of posterior femur not reaching to tip, and distal third of posterior tibia brownish, sometimes an indication of an incomplete brownish ring around middle of posterior tibia; four apical segments of posterior tarsus brownish on dorsal surface; segment 1 of posterior tarsus slightly longer than half of tibia, apex more or less brownish.

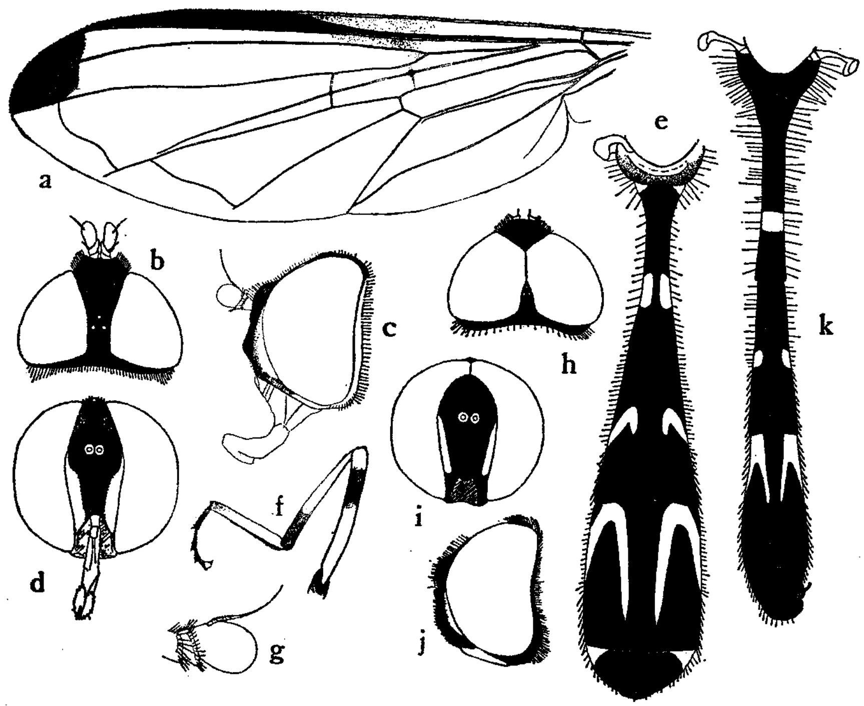



FIGURE 6.—*Baccha apicalis*. **a-g**, female: *a*, left wing; *b*, head, dorsal view; *c*, head, lateral view; *d*, head, frontal view; *e*, abdomen, dorsal view; *f*, hind leg, outer side; *g*, antenna, outer side. **h-k**, male: *h*, head, dorsal view; *i*, head, frontal view; *j*, head, lateral view; *k*, abdomen, dorsal view.

Wing more acute at tip, terminal portion of media, closing subapical cell, more oblique than in female; suffused with brown, lighter at base on inner side, darker in costal and subcostal cells and in middle, and with pterostigma and an elongated, not sharply defined, spot at tip, above $R_{4+5}$ dark brown; $R_{4+5}$ gently curved; first anal vein (spuria analis) well developed.

*Female:* Frons nearly one-eighth as wide as head at vertex, gradually broadened forward, but antenniferous projection narrower than in male, shining bluish black, with a somewhat triangular patch of pale yellowish pollen on each side. Face slightly and facial stripe conspicuously narrower than in male; central knob more conspicuous than in male. Orbital occiput distinctly clothed with whitish pollen, with a fringe

*M. purpurescens* is somewhat allied to *M. coeruleus simplex* Shiraki, but it is at once recognizable by the coloration of the body and legs, the white pubescent abdominal bands present only on the third and fourth segments, and the very short cerci.

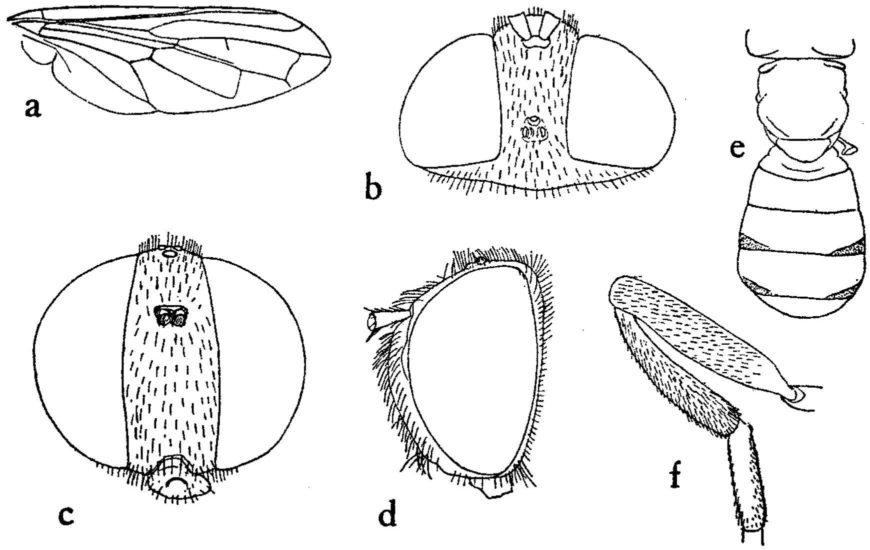



FIGURE 7.—*Microdon purpurescens,* female: **a,** right wing; **b,** head, dorsal view; **c,** head, frontal view; **d,** head, lateral view; **e,** thorax and abdomen, dorsal view; **f,** hind femur, tibia, and metatarsus.

## SUBFAMILY EUMERINAE

Small or medium-sized flies, moderately pubescent, with peculiar pale lunules on abdomen unless obscured by a reddish ground color. Head hemispherical; face rather flat, without median callus, pubescence distinct but not long; cheeks small and retreating beneath eyes; back of head shallow, but suddenly expanded on upper one-fourth. Eyes more or less pubescent, almost bare in some species, touching on frons in male either at one point or for a considerable distance, but always widely separated in female. Antennae moderate in length, drooping; segment 3 rather round, varying a little in length, usually larger in female; arista bare, placed before dorsal middle of third joint. Thorax subquadrate, slightly arched, entirely aeneous black, usually with very short pile, without distinct bristly hairs; scutellum also aeneous black, marginate but without distinct marginal hairs or bristles, although margin appears to be serrulate. Abdomen longer than thorax, parallel-sided or slightly widened near middle, being blunt at tip in male, but pointed in female; pubescence short and appressed. Legs rather strong; hind femur thickened, bearing short stout bristles or minute spines beneath; hind tibia curved. Wings rather broad, without markings; marginal cell open; anterior cross vein at or beyond middle of discal cell; third longitudinal vein nearly

straight to distinctly looped; subapical cross vein remarkably angulated and reflexed at its upper end; postical cross vein with its upper end more remote from wing margin than its lower end; alulae rather large.

## Genus **Eumerus** Meigen

*Eumerus* Meigen, 1822, Syst. Beschreib. Zweifl. Insekten **3**: 202.
*Citibaena* Walker, 1857, Linn. Soc. Lond., Jour. Proc. **1**: 124.
*Paragopsis* Matsumura, 1916, Thousand Insects of Japan, Addition **2**: 250.

Small, dark, often metallic flies, seldom relieved by spots of lighter color. Eyes pubescent or bare, contiguous in male for a distance varying from a long space to little more than a point, sometimes very narrowly yet distinctly separated, wide apart in female. Face rather flat, without central callus, oral margin rounded, or face may be retreating or concave and retreating. Antennae short; segment 3 often truncate apically or subtriangular; arista bare, placed before middle of segment 3. Scutellum concolorous, usually with thin emarginate rim, sometimes minutely serrulate. Abdomen longer than wide, parallel-sided or slightly widened at about middle, segments often transversely excavated or bullate; pubescence short. Legs moderately strong; hind femur thickened, spinose denticulate ventrodistally; hind metatarsus generally incrassate and in some species succeeding segments also conspicuously dilated. Wings with marginal cell widely open; anterior cross vein at or beyond middle of discal cell; third vein often sinuous, sometimes looped; apical cross vein angulated, usually with spur, last section strongly recurrent.

### 10. **Eumerus guamensis** Shiraki, n. sp. (fig. 8).

*Male:* Small, metallic, greenish-black species, marked with yellowish spots. Head a little wider than thorax, twice as wide as long, 1.2 times as wide as high; frons densely covered with orange-yellow, reclinate pubescence, distinctly narrowed in front of median ocellus, suddenly broadened anteriorly and gradually broadened posteriorly, narrowest area being 0.07 times width of head, with a distinct transverse sulcus, pubescence on vertical portion quite erect and more sparse than rest; face nearly 0.3 times as wide as head, distinctly longer than wide, parallel-sided, metallic greenish black, clothed all over with abundant yellow pubescence as on frons; genae small, with long, yellowish-white hairs; back of head very shallow and apparently bare, upper one-fourth abruptly widened and shining greenish black with short yellowish pubescence. Eyes distinctly separated, densely clothed with orange-yellow pubescence, but posterior borders are nearly bare; in profile more or less oblong, anterior margin evenly convex and posterior margin nearly straight, with upper and lower angles rounded. Antenna reddish yellow; segment 3 nearly as wide as long, subquadrate, with a comparatively distinct sensorium near base of inner side; segments 1 and 2 bearing some yellowish setae; arista blackish, with bare, pale-colored, distinctly thickened basal segments.

Mesonotum little longer than wide, metallic greenish black, clothed with dense, erect orange-yellow pubescence which becomes more sparse on hind half except posterior border; humeri somewhat brassy black, furnished with some long hairs; postalar calli distinctly brassy black; scutellum metallic greenish black, clothed with rather long, sparse, yellowish hairs, with margin flattened except at basal corners, this margin appearing to be composed of about 20 short, stout, spinelike processes coalesced except at very tips, and just in front of this margin another similar serrulation. Pleura similarly colored as mesonotum but more or less grayish tomentose, clothed with rather long hairs except pteropleuron and metaepimeron, former also quite bare of dust; posterior stigma brownish, along margin a row of minute setae.

Abdomen metallic, somewhat greenish black, clothed with rather long orange-yellow pubescence, a little longer than head and thorax together, as wide as thorax,

gradually narrowed apically; segments 2 and 3 each with one pair of orange-yellow spots, the first pair large and subquadrate, the second, small and lunulate; hypopygium shining black, practically bare.

Wing as long as thorax and abdomen together, nearly 2.7 times as long as wide, quite hyaline, with light-yellow pterostigma; r-m just beyond middle of discal cell, distinctly oblique and moderately curved outwardly at lower end; $R_{4+5}$ nearly straight but last section more or less sinuate; $R_5$ cell with the apical margin remarkably angulate, this angle with a distinct spur, lower section strongly recurrent, lower angle a right angle and bearing a short spur; discal cell with both upper and lower angles right angles, lower angle bearing a short spur.

Legs rather strong. Front legs shorter than rest; femur blackish with yellowish-brown apical portion and with long yellowish hairs on posterior side; tibia two-thirds as long as femur, yellowish with apical half brownish; tarsus yellowish white, clothed

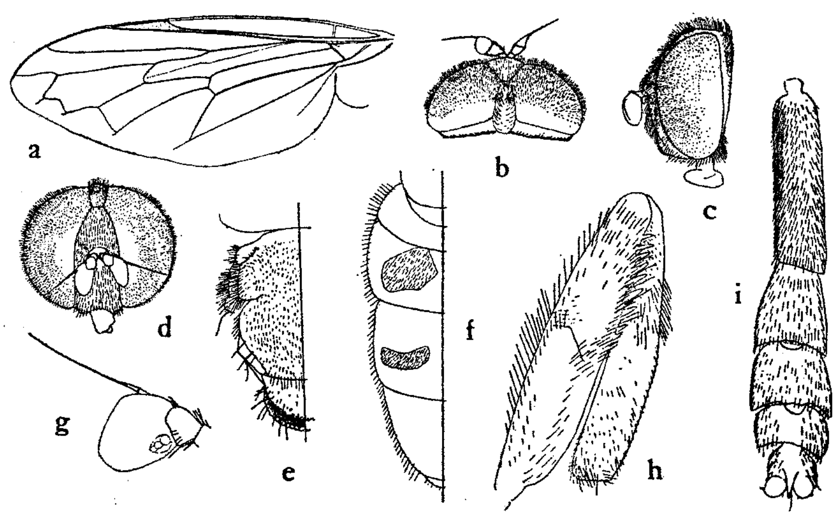



FIGURE 8.—*Eumerus guamensis,* male: **a,** left wing; **b,** head, dorsal view; **c,** head, lateral view; **d,** head, frontal view; **e,** thorax, dorsal view; **f,** abdomen, dorsal view; **g,** antenna, inner side; **h,** hind femur and tibia, outer side; **i,** hind tarsus, dorsal side.

with a short white pubescence, a little shorter than tibia, segment 1 distinctly thickened and nearly as long as three following segments combined. Mid legs rather slender, longer than front legs; femur colored and pubescent as in front femur; tibia a little shorter than femur, yellowish with apical half brownish, and with long yellowish hairs at outer side of basal half; tarsus a little shorter than tibia, segment 1 slender, yellowish, as long as three following segments combined, remaining four segments wider than metatarsus and distinctly white. Hind legs strongly thickened; femur metallic greenish black with yellowish apex, and with long yellow hairs on outer side, cicatrix about middle, about 10 distinct short spines on apical half of underside; tibia a little shorter than femur, yellowish, apical half black with apex yellowish, clothed with long yellowish hairs on outer side; tarsus nearly 1.4 times as long as tibia, brown, except four apical segments which are white, metatarsus as long as three following segments together and slender, four apical segments distinctly widened.

Length 7.1 mm.; wing length 6 mm.

Holotype, male (US 66516), Pt. Oca, Guam, May 1945, G. Bohart and Gressitt.

DISTRIBUTION: S. Mariana Is. (Guam).

*E. guamensis* is related to *aurifrons* Wiedemann, but differs in that the fourth abdominal segment has no spot and in other characters.

### SUBFAMILY GRAPTOMYZINAE

Small, black, rather shining, with well-defined yellowish bands or stripes. Head always wider than thorax, transverse; eyes well separated in both sexes, bare or pubescent; frons rather flat, without an extended frontal process; face usually produced below or rarely not, with median callus narrowly developed. Antennae with segment 3 usually very elongate or very large; arista dorsal near base of segment 3, pubescent to plumose. Thorax short, shining, with distinct black bristles along lateral margins of mesonotum and at margin of scutellum; scutellum provided with a peculiar disclike concavity on large median portion, concavity membranous, not sclerotized and with characteristic setae, in life it may be swollen while scutellar ampulla is working. Abdomen broad, strongly arched. Wings broad, with marginal cell widely open and spurious vein absent; third longitudinal vein always nearly straight; subapical and postical cross veins rectangular or somewhat recurrent; anterior cross vein before basal third of discal cell. Legs fairly robust.

This subfamily can be clearly separated from the Volucellinae by the scutellar concavity and also by the absence of the spurious vein.

The following three species have been collected in Micronesia.

### Genus **Graptomyza** Wiedemann

*Graptomyza* Wiedemann, 1820, Nova Dipt. Gen., 16.
*Baryterocera* Walker, 1856, Linn. Soc. Lond., Jour. Proc. **1**: 123.
*Ptilostylomyia* Bigot, 1882, Soc. Ent. France, Ann., Bull. VI, **2**: cxiv.

Small flies with conspicuous yellow markings. Head wide and short, rather transverse, with dichoptic eyes in both sexes. Face straight for some distance below antennae, produced diagonally forward in a blunt, or sometimes very acute, cone. Antennae a little above middle of eyes; segment 3 usually quite long and compressed, porrect or somewhat drooping; arista long, slender, nearly bare to long plumose. Thorax short and broad, with chaetae; scutellum with marginal bristles, and with a disclike central concavity which is quite membranous, not depressed in living state, and with rather dense microchaetae, this concavity not situated on preapical margin and also not transverse slitlike as in *Phalacromyia* Rondani. Abdomen markedly convex, sides thick and rolled over, apex almost always with a collarlike shield concealing genitalia; segment 1 often dentate along posterior margin. Vena spuria completely absent except for a nodal trace on anterior cross vein.

### KEY TO MICRONESIAN SPECIES OF GRAPTOMYZA

1. Wings with markings..............................2
   Wings without marking..............................**11. minor**
2. Segment 4 of abdomen with only one median longitudinal stripe..............................**12. oceanica**
   Segment 4 of abdomen with three longitudinal stripes..............................**13. uchiyamai**

**11. Graptomyza minor** Shiraki, n. sp. (fig. 9).

Very small species, light testaceous in color, nearly 3 mm. in length.

*Female:* Head as wide as thorax, 1.8 or less times as wide as high. Frons hardly broadened forward, with lateral margins very slightly curved outward, somewhat broader than eye, shining black except apical half luteus, abundant erect brownish setae on surface; lunule luteus, strongly shining, with a distinct longitudinal sulcus; ocellar triangle distinct and placed along vertical hind margin, nearly one-fourth as wide as vertex, with a pair of short black ocellar bristles, ocelli equidistant. Face almost parallel sided, but lateral margins very slightly curved inward, nearly as wide as eye, straight for some distance (less than one-third of its entire length) below antennae, then produced diagonally into a long acute cone, without facial knob, but with a more or less

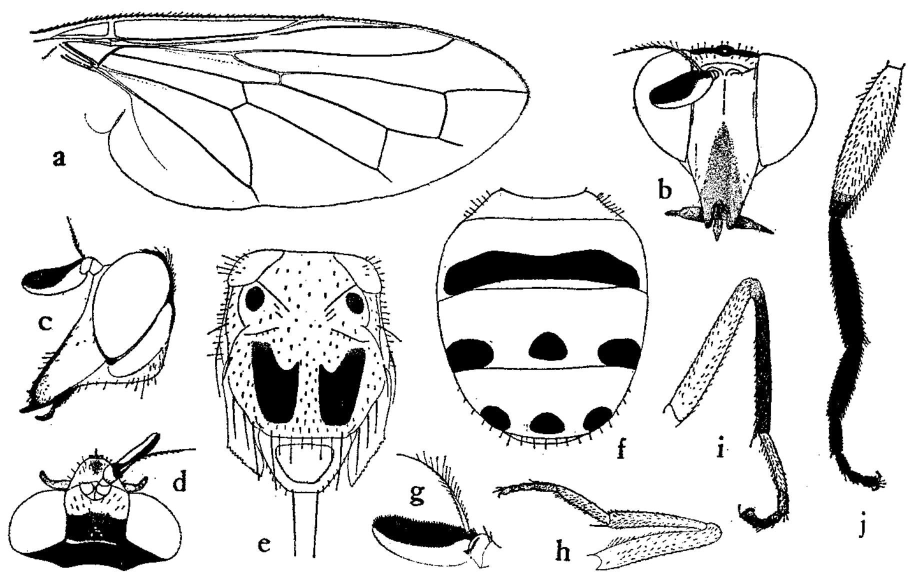



FIGURE 9.—*Graptomyza minor,* female: **a,** right wing; **b,** head, frontal view; **c,** head, lateral view; **d,** head, dorsal view; **e,** thorax, dorsal view; **f,** abdomen, dorsal view; **g,** antenna, inner side; **h,** front leg, outer side; **i,** middle leg, outer side; **j,** hind leg, outer side.

distinct keel from between antennal fossae to epistomal margin, keel becoming obsolete on brownish area, waxy yellow, with lower median area brownish, becoming blackish at mouth edge and angularly pointed above, with sparse brownish pubescence. Genae large, distinctly swollen, light yellow; back of head rather flat, shining black, with some yellowish setae, lower part yellowish and moderately swollen, just below lower angle of eye (anterior upper corner of gena) blackish. Eyes comparatively large, in profile nearly perpendicular, oval with narrow lower angle, with anterior margin strongly convex, 1.6 times as high as wide, bare. Epistoma rather long and narrow. Antenna nearly half as long as face; segment 1 very narrow, little shorter than 2, brownish, with a few tiny black setae; segment 2 broad, as wide as long, brownish, with a short spinelike process on inside apical border, with some black and yellowish

setae; segment 3 is 2.5 times as long as wide, with upper margin nearly straight and lower margin moderately convex, apex round, microscopically pubescent, yellowish except upper half blackish; arista a little longer than antenna, basal half thick and light yellowish, apical half fine and black, dorsal side with long sparse pubescence which is black on black integument and light yellowish on pale part. Proboscis narrow and short, blackish brown, with very large labial palpi; labella very small.

Mesonotum shining light yellowish, with two pairs of black spots, of which anterior pair is small, roundish, and placed just behind humeral calli, posterior pair very large and somewhat quadrate and placed on scutum. Mesonotum as long as wide; oblique, rather distinct keel from middle of hind margin of humeral callus to near inner end of rather weak transversal suture; pubescence black, minute and very sparse; lateral bristles black, long and conspicuous, one presutural, one notopleural, one anterior supraalar, three posterior supraalar, one prescutellar. Scutellum waxy yellow with a pair of long black apical bristles; depression comparatively large, leaving rather narrow marginal area, more or less dull-colored. Pleura luteous.

Abdomen nearly as long as and distinctly wider than thorax, oval, light testaceous, furnished with short black setae, segment 2 with black transverse band near posterior margin which does not reach lateral margins, segments 3 and 4 each with three black spots along posterior margins as figured; ovipositor very short, consisting of segments 6 to 8, more or less blackish.

Wing as long as body, more than 2.6 times as long as wide, nearly colorless, hyaline, with light-yellowish pterostigma, no markings; vena spuria very faintly traceable only at basal portion; veins more or less blackish.

Legs yellowish; anterior leg with apical tibial spur, four apical segments of tarsi slightly dark-colored; mid leg with tibia (except at base) and four apical tarsal segments blackish; posterior leg rather broad, from apex of femur to apical tarsal segment black; claws yellowish, with apical third black.

*Male:* Unknown.

Holotype, female (CM), Peleliu I., Palau, Aug. 1, 1945, Dybas.

DISTRIBUTION: Caroline Is. (Palau).

This species is very distinct from the known species of *Graptomyza* in lacking the wing pattern and the central knob of the face.

## 12. **Graptomyza oceanica** Shiraki, n. sp. (fig. 10).

Yellowish species with black patterns; medium-sized, length 6 mm.

*Female:* Head as wide as broadest part of thorax, 2.5 times as wide as long, a little wider than high. Frons very slightly wider than eyes, parallel-sided with straight lateral margins, ivory yellow, with a large, transverse, somewhat quadrate black median spot reaching to black, shining, elevated lunule and behind to brown ocellar triangle, with sparse yellowish setae all over surface; vertical calli rather distinct, large, and oval, occupying entire vertex except ocellar triangle which is nearly one-sixth as wide as vertex and has a pair of fine ocellar bristles. Face more or less parallel-sided with straight lateral margins, a little wider than eye, well produced below eye, light yellow, with a rather broad, black, median longitudinal streak from antennal bases to dull-colored epistoma; in profile moderately hollowed at about upper two-thirds and then perpendicularly downward to obtuse lower angle with oblique genal margin, this perpendicular portion with some long, erect, black setae and remaining portion more or less yellowish pubescent; gena nearly one-eighth as wide as height of eye, light yellow with a black triangular streak from just before lower angle of eye to near apex of facial cone, lower margin almost straight, with some brown setae; postgena yellowish, pale pubescent, more or less swollen. Back of head moderately hollowed, but lower portion more or less convex, black with lower part distinctly yellowish, along eye margin dense brownish pubescence and on upper orbit some black bristly hairs. Eyes large, in profile perpendicular, oval, with anterior margin nearly evenly strongly convex and

posterior margin slightly convex, upper and lower angles similar, about 1.6 times as high as wide, rather sparsely pubescent. Antenna not reaching facial knob, yellowish brown; segment 1 nearly as long as 2, latter wider than long and with some long yellowish setae on dorsal corner; segment 3 with dorsal half somewhat darkened, 2.4 times as long as wide, with dorsal side very slightly concave apically and ventral side moderately convex, apex rounded, no distinct sensoria; arista black with the basal segments yellowish, microscopically pubescent but not plumose.

Thorax rather pentagonal, yellowish, with rather sparse, fine, yellowish setae, shining black with ivory-yellow marks. Prothorax ivory yellowish, with lateral lobes brownish. Mesonotum nearly 1.5 times as wide as long, lateral and posterior portions ivory yellowish except upper portion of bases of wings blackish; one presutural, one notopleural, one anterior supraalar and three posterior supraalar bristles distinct. Scu-

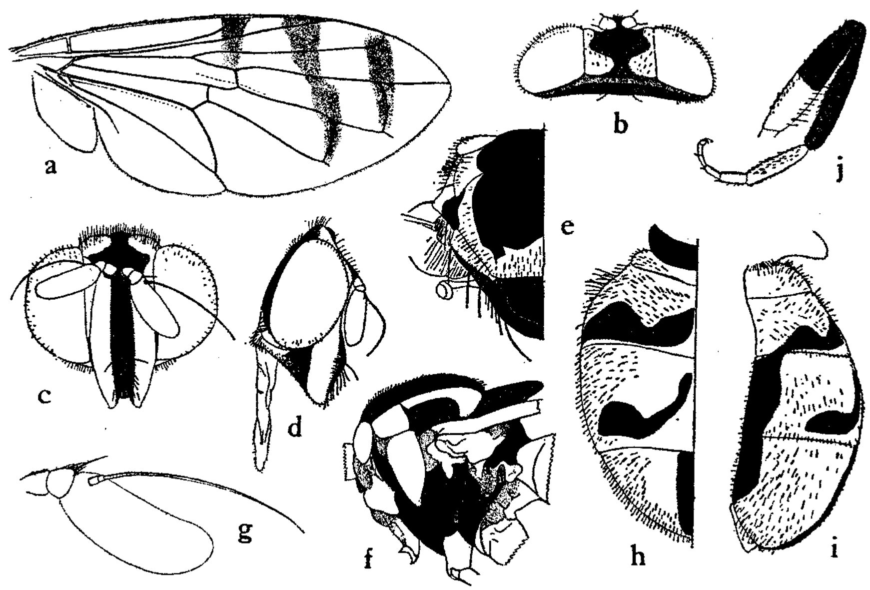



FIGURE 10.—*Graptomyza oceanica,* female: **a**, right wing; **b**, head, dorsal view; **c**, head, frontal view; **d**, head, lateral view; **e**, thorax, dorsal view; **f**, thorax, lateral view; **g**, antenna, inner side; **h**, abdomen, dorsal view of left half; **i**, abdomen, lateral view; **j**, hind leg, outer side.

tellum 1.6 times as wide as long, nearly semicircular, with depression occupying median half, depression covered with dense, depressed, brownish setae, lateral borders with many black, bristly hairs and one pair of lateral bristles. Pleura with large ivory-yellowish mesopleural oblong spot, as figured.

Abdomen slightly wider than thorax, oval, a little longer than wide, light reddish yellow, covered with rather dense yellowish pubescence, black fasciae as shown in figures (two paratypes show abdominal tergite 4 with three longitudinal stripes, lateral ones smaller than median); venter excavate, somewhat more reddish, especially sternites, with sternite 4 blackish brown; ovipositor blackish.

Wing 4.6 mm. in length, distinctly shorter than length of body, nearly 2.5 times

as long as wide, with three brownish transverse fasciae as figured; costal vein hardly exceeding tip of $R_{4+5}$; vena spuria almost wanting.

Legs ivory yellow, rather densely covered with yellowish setae; fore and mid femora more or less brown except apical one-fourth or one-third; hind legs comparatively broad; femur a little longer and conspicuously wider than tibia, with apical half blackish; tarsi distinctly longer than tibia which is blackish except base, segment 1 as long as four following segments together, rather wide; claws black.

*Male:* Unknown.

Holotype, female (US 66517), Sonsorol I., Caroline Is., Sept. 13, 1952, Krauss. Paratypes: (BISHOP, US), females, same data as holotype.

DISTRIBUTION: Caroline Is. (Sonsorol).

This species is near to *G. uchiyamai,* but it is distinguished by the pattern of abdomen, the two anterior pairs of femora not entirely yellowish, and the third antennal segment being comparatively wide.

**13. Graptomyza uchiyamai** Shiraki.

*Graptomyza uchiyamai* Shiraki, 1930, Taihoku Imp. Univ. Mem. Fac. Sci. Agric. **1**:232, fig. 53.

*Female:* Frons yellow with somewhat quadrate black median spot between lunule and ocellar triangle; face yellow with broad, black, median streak from antennal bases to dull-colored epistoma; gena light yellow with black streak from lower edge of eye to margin of oral cavity. Antenna with segment 3 elongate, a little curved, dorsal part brown, remainder yellowish, apico-dorsal corner often angulate.

Mesonotum black with lateral and posterior parts pale yellow and quadrate spot above wing base black. Pleuron black with posterior half of mesopleuron shining yellow.

Abdominal color pattern similar to *oceanica,* but sternite 4 with three subequal longitudinal black stripes.

Legs chiefly yellow or orange, apical half of hind femur and hind tibia black.

*Male:* Unknown.

DISTRIBUTION: Micronesia.

PALAU. Koror: one, Aug. 1952, Beardsley; one, Sept. 1952, Krauss. Angaur: seven, Feb. 1948, Dybas; one, Jan. 1953, Beardsley.

CAROLINE ATOLLS. Woleai: three, Feb. 1953, Beardsley.

## Subfamily XYLOTINAE

Small to large, narrow to broad, blackish flies. Head usually broader than, or as wide as, thorax, but very rarely distinctly narrowed; frons prominent, usually bare or only slightly pubescent; face mostly hollowed below antennae, usually without a median callus but rarely with a flat one; cheeks usually not well developed beneath eyes. Eyes commonly bare, touching or approximate in male, but distinctly separated in female. Antennae usually not elongate, moderately drooping, very rarely porrect; arista dorsal and bare. Anterior cross vein at or after middle of discal cell and usually very oblique; third longitudinal vein not bending deeply into subapical cell; subapical cross vein oblique, at most very slightly recurrent at apex; marginal cell open; stigmal cross vein rarely present.

At the present time only three species, belonging to two genera, are known from Micronesia.

### Key to Micronesian Genera of Xylotinae

Face subcarinate; hind femora conspicuously incrassate.......................................... **Syritta**
Face not carinate; hind femora more or less thickened.......................................... **Xylota**

## Genus **Xylota** Meigen

*Xylota* Meigen, 1822, Syst. Beschreib. Zweifl. Insekten **3**: 211.
*Zelima* Meigen, 1800, Nouv. Classif. Mouches, 34.
*Eumeros* Meigen, 1803, IN Illiger, Mag. Ins. **2**: 273.
*Heliophilus* Meigen, 1803, ibid. **2**: 273.
*Eumerus* Meigen, 1804, Klassif. Eur. Ins. Dipt. **1** (1): xx.
*Micraptoma* Westwood, 1840, Introd. Classif. Insect. 2, Syn, 136.

Rather elongate, median-sized to small, blackish, often metallic flies. Head generally slightly broader than thorax; eyes bare, contiguous in male, widely separated in female; face hollowed below moderate antennal prominence, upper mouth edge distinctly produced, central knob absent. Antennae short; segment 3 rather large, round or oval, compressed, with bare sub-basal arista. Thorax oblong, fairly arched; scutellum concolorous, marginate, with ventral fringe; metasternum pubescent. Legs strong; hind femora more or less thickened or lengthened, generally serrulate below; hind trochanter of male often with a process or spine below; hind tibiae more or less curved, sometimes ending in a distinct spur. Marginal cell open; third vein nearly straight; anterior cross vein at or after middle of discal cell, very oblique.

**14. Xylota boninensis** Shiraki, n. sp. (fig. 11).

*Male:* Head about half as long as wide and about 1.4 times as wide as high. Space on frons occupied by eyes a little longer than frontal process, latter densely covered with a whitish tomentum except shining black lunule; vertical triangle shining greenish black, with blackish erect pubescence, about 1.5 times as long as fused portion of eyes. Face nearly as long as wide, slightly broadened beneath, densely covered with a whitish tomentum, in profile moderately hollowed at about middle; epistoma dull black; gena triangular, black, more or less shining. Back of head dull black, upper orbit black and furnished with tiny black bristly setae, lower orbit covered with whitish tomentum and with whitish pile. Eyes in profile distinctly narrowed beneath, posterior margin somewhat straight, anterior margin conspicuously, rather evenly, curved outward; frontal facets more or less larger than others. Antenna dull black; segment 2 viewed from inside distinctly broadened apically, apex evenly rounded, dorsal spine-like bristle conspicuous, apicoventral bristles very long; segment 3 is 1.5 times as long as wide, elliptical, with a comparatively large sensorium near base of inside; arista black with black basal segments, twice as long as antenna.

Mesonotum subquadrate, slightly narrower than head, hardly 1.5 times as long as wide, shining cupreous black, densely covered with very short, erect, yellowish-brown pubescence which becomes longer on upper wing base and hind marginal areas; humeral calli comparatively large, more or less covered with a whitish tomentum and furnished with yellowish-brown, short, erect pubescence. Scutellum rather flat, rounded and marginate posteriorly, color and pubescence as of mesonotum, but more or less greenish and pubescence rather depressed and longer, no marginal bristles. Pleura less cupreous than in mesonotum, rather shining greenish black, hardly tomentose, but mesoepisternum and sternopleuron sparsely covered with a whitish dust, former furnished with dense yellowish hairs; stigma furnished with reddish-brown fringe.

Abdomen longer than head and thorax together and slightly narrower than thorax, rather parallel-sided; segment 1 shining greenish black, yellowish pubescent; follow-

ing segments shining bluish black; segment 2 distinctly longer than 3 and slightly narrowed posteriorly, with a pair of large lateral reddish-yellow patches occupying entire lateral borders but becoming narrower inward (sometimes connected at middle area), bearing a fan-shaped patch of long yellowish hairs at anterior side; segment 3 slightly widened behind, with similar but smaller reddish-yellow lateral patches (sometimes nearly united at middle); segment 4 without lateral patches but with distinct light-yellowish pubescence at lateral borders; hypopygium shining greenish black, with dull-blackish cerci and surstyli.

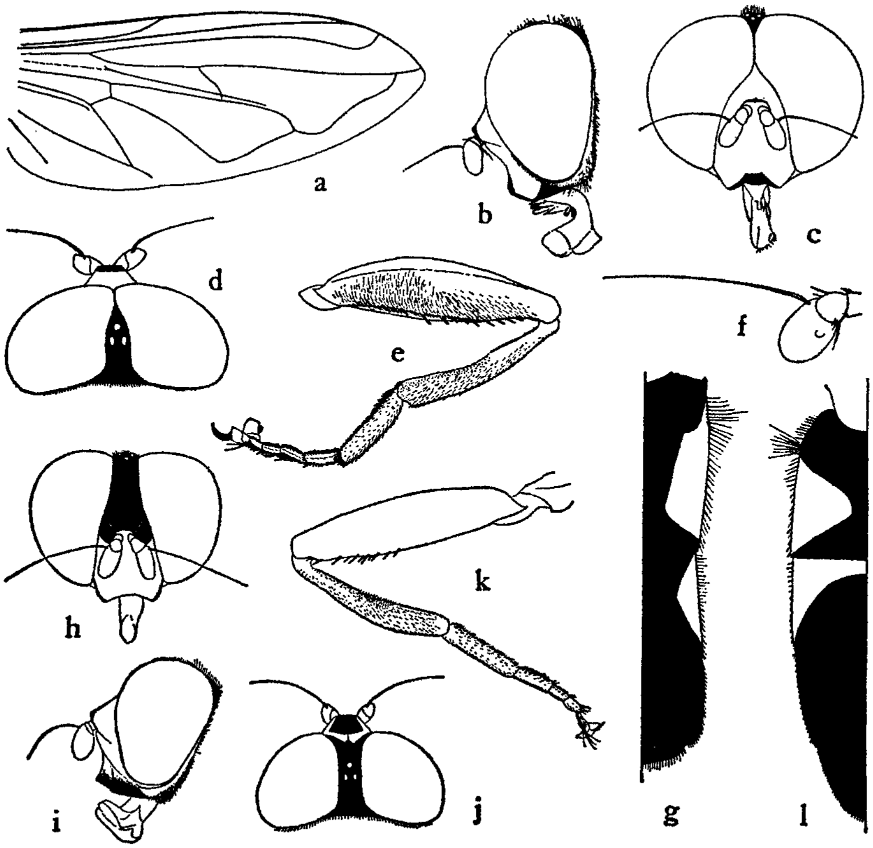



FIGURE 11.—*Xylota boninensis.* a-g, male: *a,* right wing; *b,* head, lateral view; *c,* head, frontal view; *d,* head, dorsal view; *e,* hind leg, outer side; *f,* antenna, inner side; *g,* abdomen, right half. h-l, female: *h,* head, frontal view; *i,* head, lateral view; *j,* head, dorsal view; *k,* hind leg, outer side; *l,* abdomen, left half.

Wing slightly infumated toward apex, with pterostigma yellowish brown and costal cell light yellowish, about 3.2 times as long as wide; $R_{2+3}$ strongly curved and right-angled to costa; $R_{4+5}$ nearly straight and reaching just above wing tip; r-m quite

oblique, just after middle of discal cell; spurious vein hardly traceable at basal one-third; 1 A (so-called anal spurious vein) reaching to upper angle of so-called anal cell. Squamae grayish white with brown thickened margins and fringes; alula moderate in size. Halter light orange yellow, with base more or less darkened.

Coxae and trochanters black; femora black, except tips of two anterior pairs pale orange yellow; two anterior tibiae light orange yellow, with apical two-thirds brownish black; two anterior tarsi light yellowish, with three apical segments blackish. Hind coxa furnished with rather long pale pubescence on outer side; hind femur moderately thickened and narrowed toward both ends, outer lower margin with conspicuous but rather short black spines except on basal part; hind tibia black with basal one-third yellow, about 0.7 times as long as femur, underside slightly incurved at median portion, where there are many tiny very short black bristles, from here to base are many tiny, deep-black, scalelike bristles depressed as in marginal streak; hind tarsus black, slightly longer than tibia, metatarsus half as long as tibia and moderately thickened; pulvillus yellowish brown; claw black with pale base.

Length 10-11 mm.; wing length 7.5-8 mm.

*Female:* Frons nearly one-ninth as wide as head, nearly parallel-sided but distinctly broadened before frontal process, black, more or less shining, just behind frontal process with a pair of white-dusted triangular lateral patches, which barely connect at their inner angles and unite with similarly dusted lateral parts of frontal process, latter being rather flat above and bearing a transverse sulcus at base. Abdomen distinctly narrowed posteriorly, lateral patches of segments 2 and 3 reddish brown and larger than those in male, second pair united along anterior margin; segment 5 with distinct yellowish-brown hind marginal band. Hind femur less spinose along outer lower margin; hind tibia less curved.

Length 8 mm.; wing length 7 mm.

Holotype, male (US 66518), Yoake Yama, Chichi Jima, Bonin Is., Apr. 21, 1958, Snyder; allotype, female (US), Sen-zan (Northeast Bay), Ani Jima, Chichi Jima, May 28, 1958, Snyder. Paratypes: two males, same data as holotype; other males, Miyanohama, Chichi Jima, May 12-June 9, 1958; Sakai-ura, May 12-31, 1958, Snyder; Omura, Apr. 2-25, 1958, Snyder; Commanders beach, Ani Jima, Chichi Jima, Apr. 1958, Snyder.

DISTRIBUTION: Bonin Is. (Chichi Jima).

Allied to *Xylota cuprina* (Coquillett), but differs mostly in coloring, especially of the abdomen, and in other characters.

**Xylota boninensis** var. **unicolor** Shiraki, n. var.

As in *X. boninensis,* but abdominal patches of male very small and situated only at lateral margin, of female entirely absent. Male, length 9-10.5 mm.; wing length 7-8.2 mm. Female, length 9-9.2 mm.; wing length 7-8 mm.

Holotype, male (US 66519), Okimura, Haha Jima, Bonin Is., Apr. 26-May 9, 1958; Snyder; allotype, female (US), same data as holotype. Paratypes: Males, Omura, Chichi Jima, Apr. 2-25, 1958, and May 5-June 9, 1958, Snyder; Okimura, Haha Jima, Apr. 26-May 9, 1958, Snyder; Kitaiota, June 11, 1936, Ikeda. Females, Omura, Chichi Jima, May 5-June 9, 1958, Snyder; Kitaiota, June 11, 1936, Ikeda; Yatsuse R., Apr. 10-22, 1958, Snyder; Haha Jima: Okimura, Apr. 26-May 9, 1958, Snyder.

DISTRIBUTION: Bonin Is.

## Genus **Syritta** St. Fargeau and Serville

*Syritta* St. Fargeau and Serville, 1825, Encycl. Méth. **10**: 888.
*Coprina* Zetterstedt, 1837, Isis (Oken), 35; 1840, Ins. Lapp. Descr., 584.
*Xylota* Westwood (*nec* Meigen), 1840, Introd. Class. Ins. 2, Syn., 136.

Small, slender, blackish flies with yellowish markings. Head somewhat broader than thorax; eyes bare, contiguous in male, widely separated in female; face short, concave, and weakly carinate, more or less produced at upper mouth edge; antennae short, segment 3 round, compressed, with bare basal arista. Thorax long subquadrate, blackish with light-colored lateral stripes on mesonotum; scutellum marginate, without ventral fringe; metasternum pilose. Segment 2 of abdomen laterally often with a vertical, fanlike fringe of stout pile. Hind femora extremely incrassate, with short rigid spines below; hind tibia strongly curved. Marginal cell open; first posterior cell with long petiole; third vein rather concave; anterior cross vein at middle of discal cell, upright; last section of apical cross vein rectangular.

### Key to Micronesian Species of Syritta

Hind femur of male without fingerlike process at apex; female vertex black from ocellar triangle to about half way to antenna and with pair of nearly contiguous gray spots in center........................ **15. orientalis**

Hind femur of male with long, hornlike process on subapical inner margin; female vertex black surrounding ocellar triangle and yellowish below, without gray spots........................ **16. snyderi**

15. **Syritta orientalis** Macquart (fig. 12).

*Syritta orientalis* Macquart, 1846, Dipt. Exot. II, **2**: 76.
*Syritta oceanica* Macquart, 1855, Dipt. exot., suppl. **5**: 92.
*Senogaster lutescens* Doleschall, 1856 Nat. Tijd. Ned. Ind. **10**: 410, pl. 12, fig. 3 (by de Meijere).
*Syritta illucida* Walker, 1860, Linn. Soc. London, Proc. **4**: 121.
*Syritta rufifacies* Bigot, 1883, Soc. Ent. France, Ann. VI, **3**: 538.
*Syritta femorata* Sack, 1911, Ent. Mitt. II, **1**: 8, fig. 7.

*Male:* Width of eyes on frons about twice length of frontal triangle; vertical triangle elongate, twice as long as contiguous part of eyes, shining black, apical half densely covered with minute yellowish pubescence, whole with some pale pile; frontal triangle small, hardly produced, densely covered with silvery-white dust; lunule very small, inconspicuous, brownish. Face nearly parallel-sided, about as long as wide, lower mouth edge deeply emarginated triangularly, without central knob but with an inconspicuous median longitudinal elevation, in profile lower portion (oral marginal portion) slightly produced, yellowish but densely covered with a silvery-white tomentum; around oral margin broadly shining yellow, bare of dust. Back of head black, more or less gray dusted; orbit yellowish dusted and furnished with minute whitish pubescence. Eyes bare, large, front facets larger than rest; in profile posterior margin almost straight, anterodorsal margin evenly convex, anteroventral margin rather irregularly convex. Antenna orange yellow, arista blackish brown, bare, and with two yellowish basal segments; segment 1 brownish, with a few tiny black bristles at dorsal apex; segment 2 broadened apically, with a few tiny black bristles at dorsal apex and one or two more tiny black ones on inside; segment 3 two-thirds as wide as long, apex evenly rounded.

Mesonotum about 1.5 times as long as wide, more or less shining black, rather large humeri and sides down to suture wholly light yellow, traces of two short whitish stripes on the anterior margin well separated from each other, but contiguous to humeri and quite triangular; posterior calli shining yellowish brown with front narrowly dusted with yellowish-gray, dust contiguous near middle along posterior margin of disc; setae very short, yellowish, adpressed, set in minute black pits, on posterior calli some short black spinelike bristles along outer margin; scutellum less than one-third length of mesonotum, rather flattened, slightly marginate, pubescent as in mesonotum, about tip a few tiny, inconspicuous bristles. Pleurae grayish black, but meso-episternum rather yellowish gray; pubescence very short and spare, adpressed, pale.

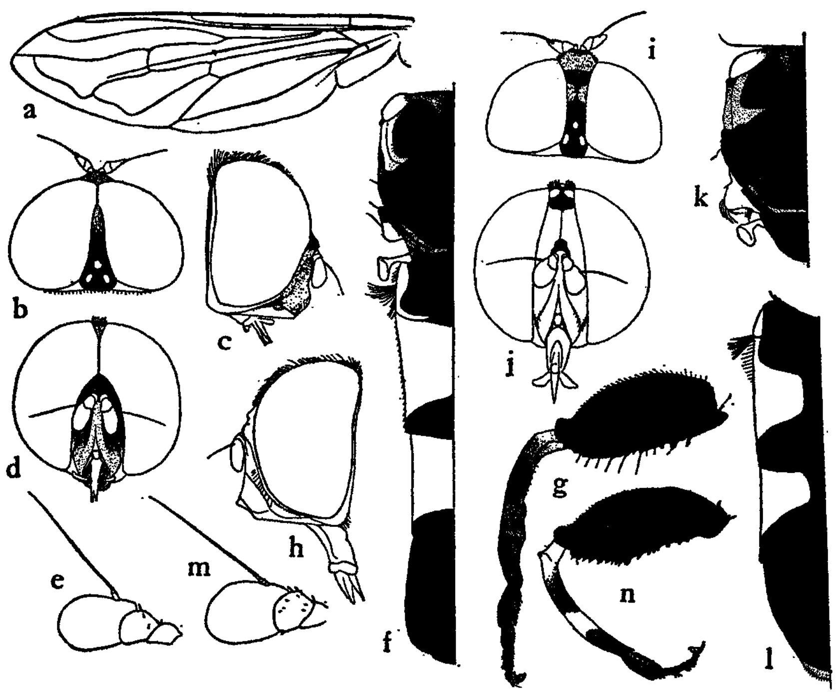



FIGURE 12.— *Syritta orientalis.* **a-g,** male: *a,* left wing; *b,* head, dorsal view; *c,* head, lateral view; *d,* head, frontal view; *e,* antenna, inner side; *f,* thorax and abdomen, dorsal view; *g,* hind leg, outer side. **h-n,** female: *h,* head, lateral view; *i,* head, dorsal view; *j,* head, frontal view; *k,* thorax, dorsal view; *l,* abdomen, dorsal view; *m,* antenna, inner side; *n,* hind leg, outer side.

Abdomen about 1.2 times as long as head and thorax taken together, more or less purplish black; segment 1 yellow at sides; segment 2 with a very large shining yellow transverse band on anterior two-thirds, band broadens toward sides and extends forward a little on anterior corners where segment itself is much produced, and at its junction with segment 1 a fan-shaped bunch of conspicuous whitish hairs; segment 3 a little shorter and narrower than preceding one, with a similar band; segment 4 as long as preceding one, but distinctly spatulate, shining purplish black, more or less

reddish yellow along posterior margin; hypopygium rather large, shining black, with minute pale pubescence; genitalia brownish.

Legs rather short; fore leg reddish yellow, femur blackish at basal third or half, segments 1 to 3 of mid tarsus with some tiny black bristles on under side. Hind femur shining black, except extreme tip brownish, nearly half as long as wide, extremely incrassate, serrate below, serration on apical third situated on a ridge where serration becomes dense and smaller, with some long pale bristly hairs along underside. Hind tibia nearly as long as femur, blackish brown, base and ring beyond middle orange yellow; underside well grooved longitudinally, except apical one-fifth, both sides minutely serrate (especially on outer side) at basal half except base, remaining sides well ridged and inner side distinctly laminate; hind tarsus brown, becoming yellowish below, less than half length of tibia, first segment long oval, longer than two following segments taken together and with two rows of tiny yellowish bristles on under side; hind coxa whitish dusted, with a few white hairs on outside; hind trochanter shining blackish, with minute spines.

Wing clear, with pterostigma and basal part of subcostal cell brownish yellow, nearly one-third as wide as long, apex more or less pointed; $R_{2+3}$ well sinuated; $R_{4+5}$ slightly curved and ending a little above apex of wing; 1 A distinct but very short and never extending to basal half of upper margin of so-called anal cell; squamae and halter light yellow.

*Female:* Frons nearly one-ninth as wide as head, more or less parallel-sided at about center, distinctly widened anteriorly and very slightly posteriorly, clothed with pale hairs all over surface with a fine longitudinal median sulcus from vertex to lunule; vertex shining black, below this a pair of yellowish-white dusted lateral spots, below this shining black, thence dusted with yellowish white to blackish lunule, with a fine black longitudinal line on lower yellowish-white dusted portion. The reddish-yellow bands of abdominal segments 2 and 3 conspicuously separated. Hind tibia without lamellate margin on underside.

Length 8.5-9 mm.; wing length 5.2-5.4 mm.

*Syritta illucida* type. Mainly distinguished from *orientalis* as follows: dusted portion of frons almost always grayish white, the median dust spots often united into one, very rarely lacking; hind femur reddish yellow about basal two-thirds but always black on dorsal side, sometimes this reddish-yellow portion separated into two by an obscure black median spot; yellowish transverse bands on abdominal segments 2 and 3 of male often separated by a fine, black, longitudinal, median stripe, and of female very rarely not divided into two lateral spots but making a complete band; abdomen of male mostly parallel-sided, almost always not distinctly narrowed in the third segment. Length 6.5-8.5 mm.

*Syritta oceanica* type. Scarcely differing from *illucida* type, except hind femur sometimes entirely reddish yellow at basal two-thirds as in *rufifacies* Bigot.

DISTRIBUTION: India, Malaya, Java, Formosa, New Zealand, Hawaii, Micronesia.

S. MARIANA IS. TINIAN: One, south end, June 1946, Townes. GUAM: One, Feb. 1958, Krauss; 11, Yigo, Oct. 1957, Krauss; two, Lamlam, Oct. 1957, Krauss; one, Mt. Lamlam, 400 m., Nov. 1952, Gressitt; one, Ukudu, Jan. 1946, Gressitt.

PALAU. BABELTHUAP: Nine, Ngerehelong, May 1957, Sabrosky; three, Netkeng, June 1957, Sabrosky; three, Ngaremlengui, June 1957, Sabrosky; four, Ngiwal, Apr. 1953, Beardsley, May 1957, Sabrosky, July 1946, Townes; two, Ngardok, May 1957, Sabrosky; four, Ulimang, Dec. 1947, Townes; one, Ngardmau, May 1957, Sabrosky. NGERGOI (Garakayo): Four, Aug. 1945,

Hagen. ANGAUR: One, Jan. 1953, Beardsley. NGERKABESANG (Arakabesan): Two, July 1946, Townes. KOROR: 13, Mar. 1948, Maehler, Apr. 1957, Sabrosky, Sept. 1952, July 1953, Beardsley, Nov. 1947, Townes; eight, Northeast corner, July 1946, Townes. PELELIU: Two, July 1946, Townes. NGAIANGL: One, May 1957, Sabrosky.

YAP. YAP: Five, Mar. 1949, Maehler, Mar. 1953, Beardsley, Aug. 1952, Krauss, July-Aug. 1950, Goss; three, Yaptown (Kolonia), July 1946, Townes, July-Aug. 1950, Goss. MAP: Two, Chol, June 1957, Sabrosky.

TRUK. WENA (Moen): Six, July-Aug. 1946, 100 ft., Townes; three, Dublon, Feb. 1948, Maehler, Oct. 1952, Beardsley.

PONAPE: Two, Dec. 1954, Davis.

MARSHALL IS. NAMU: Four, Majkon (Kaginen), Oct. 1953, Beardsley.

**16. Syritta snyderi** Shiraki, n. sp. (fig. 13).

*Male:* Space on frons occupied by eyes about 1.5 times as long as frontal triangle; vertical triangle elongate, more than twice as long as contiguous part of eyes, shining black, apical half densely covered with a minute yellowish pubescence, whole with some pale pile; frontal triangle distinctly produced, densely covered with yellowish-white dust; lunule very small, inconspicuous, brown. Face very slightly broadened beneath, lower margin triangularly emarginate, without central knob but with an inconspicuous median longitudinal elevation, in profile concave on median part and moderately produced at oral margin; yellowish white, densely covered with silvery-white dust, around oral margin narrowly shining blackish and bare of dust; gena triangularly shining blackish and without dust. Back of head black, more or less gray dusted; orbit yellowish-white dusted, and with minute whitish pubescence, eyes bare, large, front facets larger than others; in profile posterior margin almost straight but slightly emarginated above middle, anterior margin rather evenly convex, under margin narrower than upper. Antenna orange yellow with outer side more or less darkened, with blackish-brown, bare arista, latter bearing yellowish basal segments; segment 1 brownish, with a few tiny black bristles at dorsal apex; segment 2 broadened apically, with some tiny black bristles on dorsal surface and a few small ones at lower apex; segment 3 a little longer than wide, about three tiny sensoria on inside.

Mesonotum about 1.5 times as long as wide, shining black, humeri and sides down to suture wholly light yellow, traces of two short triangular whitish stripes on anterior margin, stripes inconspicuously separated from each other, but contiguous to humeri; posterior calli between wing bases and scutellum base narrowly shining brownish, front of which and prescutellar part narrowly covered with light-yellow dust; setae very minute, black, adpressed, set in minute pits, on posterior calli some short blackish bristles along outer margin. Scutellum about 0.25 times length of mesonotum, rather flattened, rather well marginated, pubescent as in mesonotum, posterior margin with sparse tiny bristly hairs and one pair of widely separated short black bristles. Pleura entirely covered with grayish dust, but mesoepisternum with yellowish-gray dust, especially on upper part.

Abdomen about 1.4 times as long as head and thorax together, more or less purplish black; segment 1 orange yellow; segment 2 with a pair of very large, orange-yellow, somewhat triangular, lateral patches on anterior two-thirds, except on anterior margin, these patches nearly united anteriorly and extending a little on anterior corners, where segment itself is much produced, at junction with segment 1 a fan-shaped bunch of conspicuous whitish hairs, posterior margin yellowish brown; segment 3 a little shorter and narrower than preceding one, with similar patches; segment 4 nearly as long as 2, but more or less spatulate, at base a pair of small round orange-yellow

patches, posterior margin yellowish brown; hypopygium rather large, shining black, with minute pale pubescence, with yellowish-white cerci and brownish surstyli.

Legs comparatively short; fore legs light reddish yellow, femur more or less blackish at basal two-thirds of dorsal surface (in some specimens almost unicolorous), tibia inconspicuously darkened near apex. Hind femur shining black, incrassate, curved dorsally and gradually broadened toward apex, apex outside triangularly produced beneath and serrate, just inside of this produced angle a blunt hornlike black process, with the tip reddish yellow and rounded, this process bends at base, and extends posteriorly, with some sparse pale pubescence; underside rather broadly sulcate longitudinally, with few fine bristles. Hind tibia distinctly, but only slightly shorter than femur, just before middle broadened somewhat angularly beneath, yellow with apical one-third black, underside well grooved longitudinally, sides not serrate. Hind tarsi blackish, with the underside golden yellow; segment 1 broad, twice as long as wide and a little longer than three following segments taken together; segment 4 smallest; claws yellow with apical half black, pulvillus yellowish white.

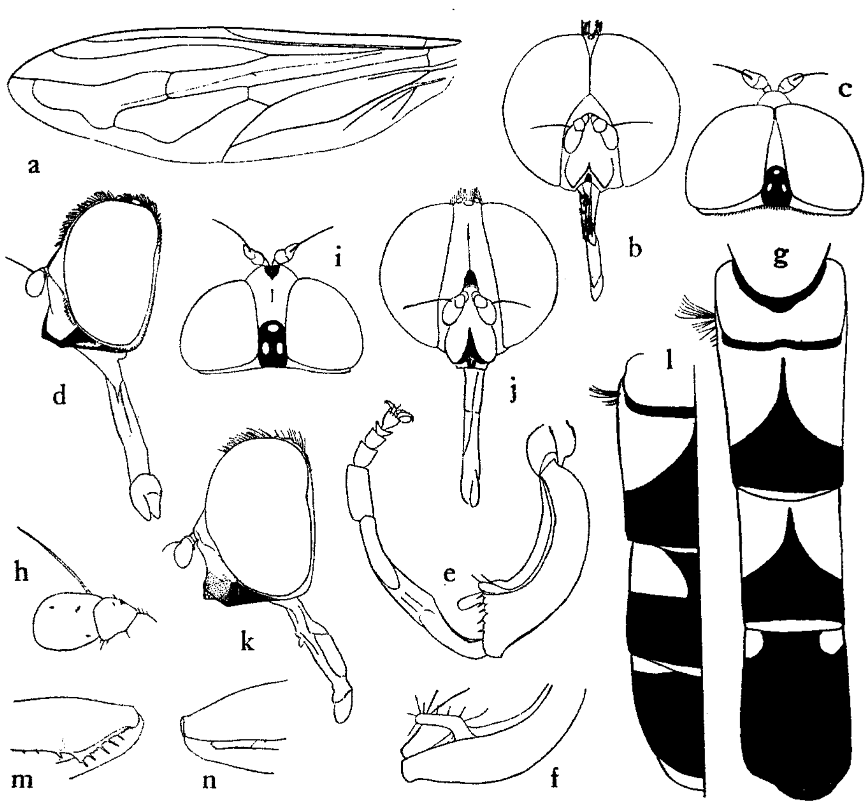



FIGURE 13.—*Syritta snyderi*. **a-h**, male: *a*, wing; *b*, head, frontal view; *c*, head, dorsal view; *d*, head, lateral view; *e*, hind leg, outer side; *f*, femur and tibia of hind leg, inner side; *g*, abdomen, dorsal view; *h*, antenna, inner side. **i-n**, female: *i*, head, dorsal view; *j*, head, frontal view; *k*, head, lateral view; *l*, abdomen, left half; *m*, hind leg, apical portion, outer side; *n*, hind femur, apical portion, inner side.

Wing very slightly fumate, with extreme base yellowish and pterostigma brown, nearly as long as abdomen and about four times as long as wide; $R_{2+3}$ sinuate; $R_{4+5}$ slightly curved into subapical cell and ending a little above apex of wing; 1 A distinct but very short and never extending to basal half of upper margin of so-called anal cell; r-m well curved, after middle of discal cell; squamae and halter light orange yellow.

Length 9-11 mm.; wing length 6-7 mm.

*Female:* Frons fully one-seventh as wide as head, slightly but distinctly widened forward, densely covered with a golden-yellow tomentum and with yellow pubescence intermixed with black on posterior portion; just above lunule a distinct elongate-triangular black spot, from which to vertex a very fine longitudinal streak, shining black, with sparse black pubescence. Reddish-yellow patches of abdominal segment 3 conspicuously separated and comparatively small, occupying only latero-anterior half, patches of segment 4 very narrow and transverse; segment 4 with distinct orange-yellow hind marginal band. Hind femur less curved, apex less triangularly produced and without process on inside; hind tibia without lamellate margin on underside.

Length 9-10 mm.; wing length 6-7 mm.

Holotype, male (US 66520), Bonin Is., Chichi Jima, Omura, May 5-June 9, 1958, Snyder; allotype, female (US), Chichi Jima, Miyanohama, Apr. 15-21, 1958, Snyder. Paratypes: Male, female, same as holotype; male, female, same as allotype except female May 12-June 9; male, Chichi Jima, Ototo Jima, Kammuri-iwa (Southwest Bay), June 3, 1958; two males, two females, Haha Jima, Okimura, Apr. 26-June 9, 1958; all Snyder.

DISTRIBUTION: Bonin Is.

This species is readily separated from other known *Syritta* by the peculiar process on the hind femur of the male.

## SUBFAMILY ERISTALINAE

Small to large pilose flies. Head almost always wider than thorax, very rarely narrower, sometimes quite transverse or semicircular; eyes bare or pubescent, in male almost always holoptic; face pilose though sometimes bare on central strip, with or rarely without median callus; frons always pilose, with or without frontal process which is rarely quite strongly produced. Antennae rather small, drooping; arista dorsal, bare to plumose. Marginal cell closed or open; third longitudinal vein with a distinct loop down about middle of subapical cell; anterior cross vein near or after middle of discal cell, except near base of latter in *Dissoptera*; subapical cross vein usually slightly sinuate. Hind femur normal or incrassate, very rarely with a conspicuous dilation or toothlike process.

There are 10 species belonging to four genera of Eristalinae in Micronesia.

### KEY TO MICRONESIAN SPECIES OF ERISTALINAE

1. Scutum and abdomen without scalelike pile; $R_{4+5}$ strongly curved....................2
   Scutum and abdomen with gray or orangish markings of scalelike pile; $R_{4+5}$ only moderately curved....................8

2(1). Wing entirely or almost entirely hyaline; not shining, metallic blue....................3
   Anterior half of wing infuscated; scutum and first three abdominal tergites shining, metallic blue; large species, body length about 20 mm....................**23. Axona chalcopyga**

3(2). Scutum conspicuously striped; eyes with spots........................................4
Scutum not striped; eyes unicolorous; generally metallic-green species........................................**17. Eristalis calliphoroides**

4(3). Facial callosity below antenna and antenniferous process black........................................5
Facial callosity and antenniferous process orange........................................6

5(4). Scutellum and abdomen black........................................**22. Lathyrophthalmus aeneus**
Scutellum orange, abdomen brown and orange........................................**19. L. viridescens**

6(4). Abdominal tergite 4 without orange spots........................................7
Abdominal tergite 4 (and sometimes 3) with a pair of oblique orange spots; median stripe on mesonotum much narrower than two lateral pairs........................................**20. L. suavissimus**

7(6). Abdominal tergites chiefly dull yellowish with narrow, black, apical bands; median pair of pronotal black stripes shorter than lateral pair........................................**18. L. lutescens**
Abdominal tergites chiefly black with anterior yellow bands; black pronotal stripes of equal length........................................**21. L. arvorum**

8(1). Abdominal tergites banded, tergites 2 and 3 without lateral spots; pile on pleura white ........................................9
Abdominal tergites 2 and 3 with lateral orange spots; pile on pleura yellowish........................................**24. Dissoptera clarkei**

9(8). Mesonotum without stripes; face in profile below antenna at about 45-degree angle from vertical axis........................................10
Mesonotum with indefinite grayish stripes; face nearly vertical in profile ........................................**25. Dissoptera gressitti**

10(9). Pile on mesonotum whitish........................................**26. D. yapensis**
Pile on mesonotum orangish........................................**27. D. palauensis**

## Genus **Eristalis** Latreille

*Eristalis* Latreille, 1804, Nouv. Dict. d'Hist. Nat. 24: 194.

Medium to large, beelike or wasplike flies. Eyes concolorous, contiguous in male, wide apart in female, pubescent, or rarely bare; face with central knob and moderately produced upper mouth edge; arista plumose or distinctly pubescent or rarely bare; scutellum not marginate; marginal cell closed; anterior cross vein before or after middle of discal cell; third vein with a conspicuous loop into first posterior cell, which is closed far from or just before wing margin.

### 17. **Eristalis calliphoroides** Shiraki, n. sp. (fig. 14).

*Male:* Entirely shining aeneous black, with velvety-black abdominal markings. Head a little wider than thorax, 1.7 times as wide as long and a little higher than wide. Frons almost entirely occupied by eyes, leaving only distinct frontal process and vertical triangle; frontal process a little wider than long, covered with rather sparse yellowish hairs, orbits very narrowly white tomentose; lunule shining yellowish brown, with a longitudinal median sulcus; vertical triangle a little longer than wide, well elevated, very sparsely pubescent, ocelli comparatively large, yellowish. Face conspicuously widened beneath with almost straight lateral margins, covered with light-yellowish dust and pubescence, except on a shining aeneous black, rather broad, median portion which extends from antennal bases to upper mouth edge and includes a rather small indistinct central knob, space from lateral mouth edge to under margin of eye also shining aeneous black; in profile undulations of face not deep and mouth much descending; gena rather small, shining aeneous, with yellowish pubescence. Back of head moderately hollowed, black, with more or less yellowish dust; orbits distinctly covered with dull orange-yellow dust and yellowish pubescence which becomes longer

beneath; occiput not bulging out. Eyes quite bare, unicolorous without spots, comparatively large; in profile almost 1.6 times as high as wide, somewhat triangular with rounded angles, posterior margin longest and slightly curved outward, anteroventral margin well curved outward. Antenna rather small, dull reddish yellow but shining brown on two basal segments; segment 1 with some tiny black bristles near upper apical margin; segment 2 a little longer than 1, near upper tip some tiny black bristles and at lower angle one tiny black bristle; segment 3 longer than wide, slightly darkened along dorsoapical margin, near lower base a rather small sensoria; arista very long, brownish black, practically bare, with a short distinct basal segment.

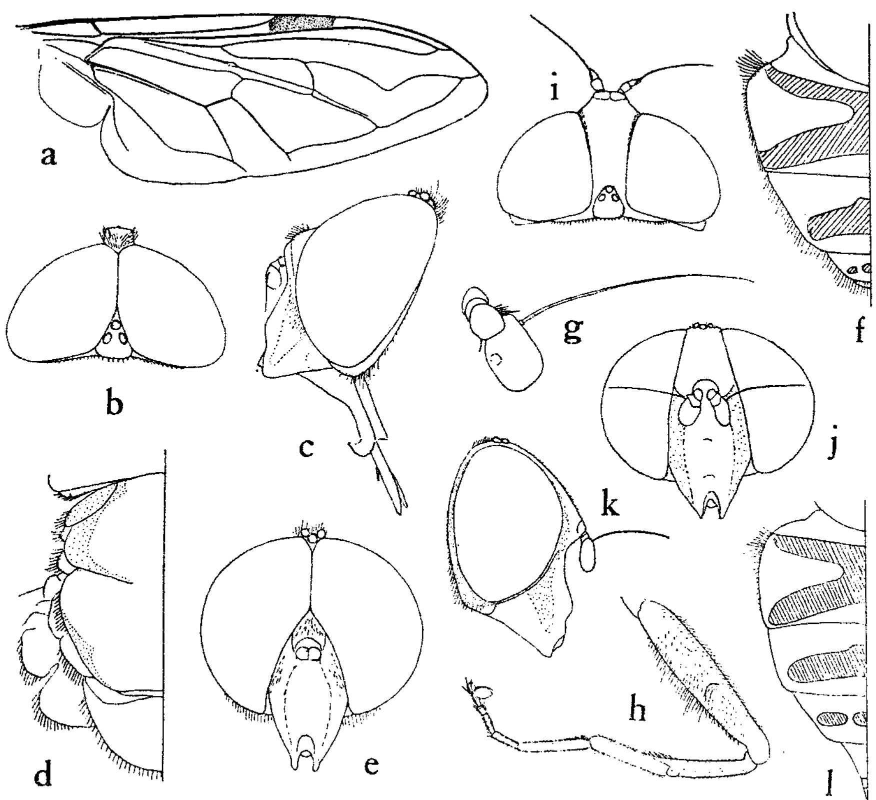



FIGURE 14.—*Eristalis calliphoroides.* **a-h,** male: *a,* right wing; *b,* head, dorsal view; *c,* head, lateral view; *d,* thorax, dorsal view; *e,* head, frontal view; *f,* abdomen, dorsal view; *g,* antenna, inner side; *h,* hind leg, outer side. **i-l,** female: *i,* head, dorsal view; *j,* head, frontal view; *k,* head, lateral view; *l,* abdomen, dorsal view.

Mesonotum nearly as wide as long, metallic greenish black, with four dull velvety black longitudinal stripes, of which two median ones are placed very near to each other and not reaching hind margin, outer pair interrupted at suture, densely covered with minute blackish pubescence which is directed obliquely posteriorly, transverse suture interrupted at about median one-third but very conspicuous; humeri less swollen, covered with dense grayish dust, this tomentose portion extends to anterior side of transverse suture along lateral margins of prescutum, and has light-colored pubes-

cence, dense grayish dust also along lateral margins of scutum; postalar calli more or less lighter than rest, with much yellowish pubescence. Scutellum comparatively large, color and pubescence as in mesonotum, no bristles along posterior margin. Pleura largely greenish, more or less grayish dusted especially on mesopleuron, clothed with a dense, yellowish-brown pubescence; first stigma very large, oblong, with dense brown pubescence; second stigma very large, somewhat roundish, entirely hollowed. its vertical length less than of first stigma, peritreme brownish black, no fringe.

Abdomen shorter and wider than thorax, but somewhat triangularly narrowed posteriorly, shining, more or less aeneous green with velvety-black markings, clothed with erect yellowish pubescence but black on black markings; segment 2 with anterior marginal border and most of posterior half, except large median hind marginal border, velvety black, these two transverse bands connected in middle; segment 3 with a velvety-black median transverse band, which is slightly produced forward in middle; segment 4 with three spots arranged transversely; hypopygium comparatively small, shining bluish black, with yellowish pubescence.

Wing as long as thorax and abdomen together, nearly three times as long as wide, very faintly smoky with distinct yellowish-brown pterostigma; $R_{4+5}$ strongly curved into $R_5$ cell; r-m just at center of so-called discal cell, which has a short spur at posterior angle; petiole of $R_1$ cell rather straight, petiole of $R_5$ cell somewhat turned up to costa; spurious vein distinct, 1 A also distinct but not reaching to fork of cubital vein; squamae large dull grayish, with blackish margins and marginal hairs; halter yellowish brown.

Legs rather slender, blackish, with basal third of anterior tibia yellowish brown; anterior femur distinctly thickened about basal two-thirds, with rather long yellowish pubescence on outer side; hind femur slightly thickened, shining black, with apex more or less brown, just after middle a distinct cicatrix, underside with a few sparse long brown hairs and on apical half a series of short black bristles; hind tibia distinctly shorter than femur, slightly curved at part of cicatrix, about median portion of underside with rather conspicuous blackish pubescence; hind tarsus shorter than tibia, segment 1 as long as remaining segments together, pulvillus yellowish, claws black.

Length 10 mm.; wing length 9 mm.

*Female:* Differing from male as follows: frons nearly one-seventh as wide as head, moderately widened forward with lateral margins slightly curved inward, frontal process broad but distinctly narrowed toward yellowish-brown lunule, ocellar triangle small, not touching eye margins and with smaller ocelli; face moderately widened below, central knob more distinct than in male; segment 5 of abdomen shining greenish black, following segments dull brown; cerci about four times as long as wide, dull brown with some yellowish pubescence.

Length 10 mm.; wing length 8.5 mm.

Holotype, male (US 66521), Ifaluk I., Ifaluk A., Caroline Atolls, Aug. 30, 1953, M. Bates; allotype, female (US), Ifaluk I., Sept. 4, 1953, Bates. Paratypes:

PALAU. Babelthuap: three males, three females, Melekeiok, May 23, 24, 1957, mangrove, Sabrosky; female, Ngerehelong, May 6, 1957, Sabrosky; two females, Ngaremlengui, June 4, 1957, Sabrosky; two females, Imeliik, Netkeng, June 5, 1957, Sabrosky; female, Ngiwal, May 20, 1957, Sabrosky; male, Iwang, 8 m., Dec. 18, 1952, Gressitt; female, Ulimang, Dec. 13, 1947, Dybas. Koror: female, Dec. 5, 1947, Dybas; male, N. E. Koror, Apr. 26, 1957, Sabrosky; male, Mar. 15-25, 1948, Maehler; male, three females, Aug. 1952 and Oct. 3, 1952, Beardsley. Angaur: male, female, Dec. 3, 5, 1949, Owen. Kayangel: male, female, Ngajangel, Dec. 15, 1952, Gressitt.

YAP. YAP: Aug., Oct. 1952, Krauss; Ruul District, July-Aug. 1950, Goss; Kolonia, June 9, 21, 1957, Sabrosky.

CAROLINE ATOLLS. SATAWAL: Two females, Sept. 22, 1952, Krauss. FARAULEP: two males, Sept. 21, 1952, Krauss. WOLEAI: male, Sept. 19, 1952, Krauss; male, Saliap, Sept. 20, 1952, Krauss. FALAULEP: male, two females, Feb. 4, 1953, Beardsley. IFALUK: male, Sept. 11, 1953, on *Wedelia*; male, Sept. 4, 1953, at light; female, July, Aug. 1953, on *Acrostichum aureum* fern; female, Aug. 4, 1953, all by Bates. ULITHI: female, Falalop, Oct. 7, 1952, Krauss; two females, Mogmog, Oct. 6, 1952, KRAUSS. LAMOTREK: male, Sept. 23, 1952, Krauss.

TRUK. WENA (Moen): 39 females, Jan. 31, Feb. 5, 11, 25, 1949, March 5, 7, 16, 22, 26, 1949, Apr. 1, 5, 10, 15, 20, 1949, Potts; Tol Netutu: female, Apr. 10, 1949, Potts; female, Mar. 1949, Langford; female, 30 m., July 31, 1946, Townes. TON: male, Mt. Unibot, 32 m., Dec. 31, 1952, light trap, Gressitt.

MARSHALL IS.: ARNO: nine females, Ine I., June 16, July 12, 22, 25, 30, Aug. 5, 1950, La Rivers. JALUIT: male, Imrodj, Aug. 24, 1946, Oakley. NAMORIK: male, Oct. 1, 1953, Beardsley.

DISTRIBUTION: Caroline Is., Marshall Is.

This new species is related somewhat to *inocriptus* Doleschall and *muscoides* Walker, but it is distinct in the patterns of abdomen and mesonotum and other characters.

### Genus **Lathyrophthalmus** Scopoli

*Lathyrophthalmus* Scopoli, 1894, Wien. Ent. Zeitung **14**: 114.

Medium to large species as in *Eristalis,* but distinguished by punctate eyes and bare arista.

### 18. **Lathyrophthalmus lutescens** Shiraki, n. sp. (fig. 15).

Yellowish species, with brown longitudinal stripes on mesonotum.

*Male:* Head a little wider than thorax, about 1.6 times as wide as long and very slightly wider than high; frons orange yellow, covered with yellowish dust and erect blackish pubescence, median two-fifths of frons occupied by eyes, much swollen apically, vertical triangle rather strongly elevated and dull black between ocelli; face a little higher than wide, more or less parallel-sided, with a rather large central knob, moderately descending beneath eyes, uniformly orange yellow, covered with yellowish dust and short, light-yellowish, rather depressed pubescence, with a fine longitudinal black median line which extends from antennal bases to upper mouth edge, interrupted by some three short transversal sulci on central knob. Back of head distinctly hollowed, dull black, lower half clothed with fine grayish pubescence; postgena waxy yellow, with yellow hairs; gena grayish yellow, with oral margin shining yellowish. Eyes purplish black, with many minute black dots all over, in profile nearly 1.3 times as high as wide, narrowed beneath, upper angle somewhat right-angled, lower angle obtusely rounded, broadest at frontal triangle, upper part brown pubescent where facets are slightly larger than on large lower portion. Antennae placed just below middle of eye, rather small, reddish yellow, with two basal segments more or less paler; tiny bristles on basal two segments yellow and black; segment 3 longer than

wide, with brownish bare arista, which becomes yellow at basal half, sensoria not conspicuous.

Mesonotum distinctly wider than long, more or less shining yellowish brown, covered with yellowish erect pubescence, with four broad, brownish-black longitudinal stripes, with the inner pair placed very close to each other and extending from anterior margin to posterior third, outer pair from anterior margin to near posterior margin, united with inner pair at anterior end and interrupted at transversal sutures; humeral calli obscured by dense grayish-yellow dust, furnished with some light-yellow hairs; postalar calli more or less waxy yellowish brown, with blackish hairs; scutellum 2.3

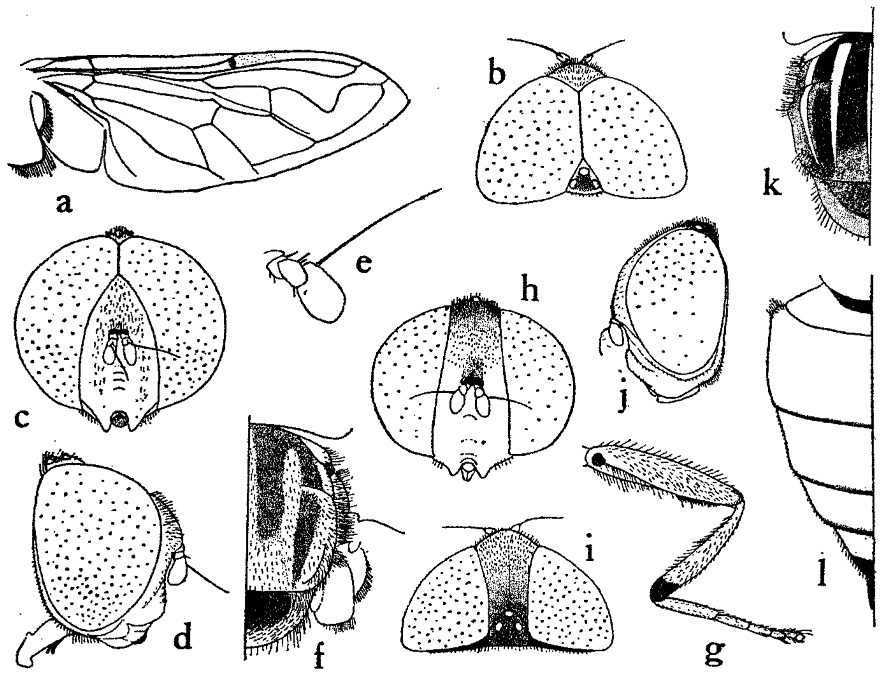



FIGURE 15.—*Lathyrophthalmus lutescens*. **a-g**, male: *a*, right wing; *b*, head, dorsal view; *c*, head, frontal view; *d*, head, lateral view; *e*, antenna, inner side; *f*, thorax, dorsal view; *g*, hind leg, outer side. **h-l**, female: *h*, head, frontal view; *i*, head, dorsal view; *j*, head, lateral view; *k*, thorax, dorsal view; *l*, abdomen, dorsal view.

times as wide as long, waxy yellow with a large median area blackish, covered with blackish, rather depressed, long pubescence which becomes longer along hind margin especially toward bases. Pleura dull yellow, more or less dusted, covered with fine yellowish-white pubescence but on mesoepisternum and pteropleurum with abundant long yellow hairs; first stigma comparatively large and oblong, densely clothed with yellowish-white fringe, second stigma also large and oval with a pair of lateral flaps, of which anterior one has yellow setae all over, while posterior one has similar setae at upper part only.

Wing glassy hyaline with light-yellow veins, pterostigma very light yellowish but at base a distinct blackish spot; petiole of R cell turned up abruptly to costa; $R_{4+5}$

conspicuously looped; spurious vein hardly traceable, colorless; discal cell with a spur at posterior angle; squamae dark grayish with black margins, anterior squama with grayish fringe, posterior one with orange-yellow fringe.

Legs yellow, with a distinct round black spot under base of each femur, these spots composed of black tiny bristles; front leg shortest, femur with long yellowish and brownish pubescence on outer side, on rest rather abundant yellow pubescence; front tibia covered with short, yellow pubescence intermixed with some black on outer side; front tarsus distinctly shorter than tibia, comparatively widened, covered with short, yellow pubescence, segment 1 thick and comparatively short, nearly twice as long as two following segments taken together; mid femur similar to fore femur but longer; mid tibia with yellow pubescence, on dorsal side with sparse black setae, four tiny black spines on under side of apex; mid tarsus as long as the tibia, segment 1 long and slender, as long as three following segments taken together, the under side with two rows of very sparse, tiny black spines, segment 2 with two rows of tiny black spines on apical half of under side, remaining segments furnished with some tiny black spines under apex; hind femur moderately thickened, somewhat brownish, clothed with yellowish pubescence, dorsal apex densely covered with tiny, depressed, black bristles, under side furnished with short, rather dense, black bristles intermixed with a few long bristly hairs at apical third and with long fine bristly yellow hairs at basal half; hind tibia blackish at apex, with yellowish pubescence, intermixed with black setae, especially on under side; hind tarsus a little longer than tibia, rather slender, with yellowish pubescence, segment 1 a little longer than two following segments taken together and with some tiny black bristles at apex, segment 2 with a few tiny black bristles at apical half of under side, segment 3 distinctly shorter than preceding and with two rows of some tiny black bristles at apical half of under side; claws black, pulvilli light yellow.

Abdomen distinctly shorter than head and thorax taken together, slightly broader than thorax, shining orange yellow, covered with a very fine yellow pubescence; segment 2 with dense short black pubescence along basal half of lateral borders; segment 3 with short black pubescence at posterior corners; hypopygium shining brownish black, covered with fine, light-yellowish pubescence.

Length, 10.3 mm.; wing length, 7.3 mm.

*Female:* Head very little wider than thorax, 1.8 times as wide as long and 1.2 times as wide as high, frons rather broad, nearly one-fifth as wide as head, moderately widened forward with very slightly incurved lateral margins, yellowish brown, more or less pale forward and distinctly darkened on vertex, with a fine longitudinal median stripe from ocellar triangle to base of frontal process, covered with grayish-yellow dust, which is darker on posterior half, and clothed with short erect brown pubescence which becomes sparse and a little longer on ocellar triangle; lunule waxy yellow, with a deep longitudinal median sulcus. Face nearly as wide as high, almost parallel-sided, nearly 0.37 times as wide as head, yellowish, densely covered with grayish-yellow dust leaving center of central knob, and moderately clothed with short yellowish pubescence, no median transverse sulci on central knob as in male, but beneath central knob about two faint transverse sulci, and on both sides of central elevation three very faint oblique, almost bare, stripes.

Longitudinal blackish stripes of mesonotum very conspicuous; mesonotum may be described as shining brownish black with five dull, yellowish-brown longitudinal narrow stripes, of which median one is very narrow. Abdominal segments 2 to 4 each with extreme posterior margin blackish; segment 5 black at apical third, following segments grayish brown; cerci long, grayish brown, with light-yellow pubescence. Pterostigma with two distinct blackish spots at base and apex.

Length 10.8 mm.

Holotype, male (US 66522), Truk, Oct. 1952, Beardsley; allotype, female (US), Truk, Mar. 1949, Potts. Paratypes: females, Truk, Mar. 1949,

Potts; Koror (May, November) (none in BISHOP or author's collection). Palau, 1934, Yoshino.

DISTRIBUTION: Caroline Is. (Palau, Truk).

The present species is rather near *arvorum* Fabricius, but it is more yellowish, has no distinct transverse bands on the abdomen and also differs slightly in morphological characters.

### 19. Lathyrophthalmus viridescens Shiraki, n. sp. (fig. 16).

Rather large species, somewhat shining greenish black, with abdomen yellowish.

*Male:* Head a little wider than thorax, fully 1.5 times as wide as long and a little narrower than high. Eyes occupying about median one-third of frons; frontal process

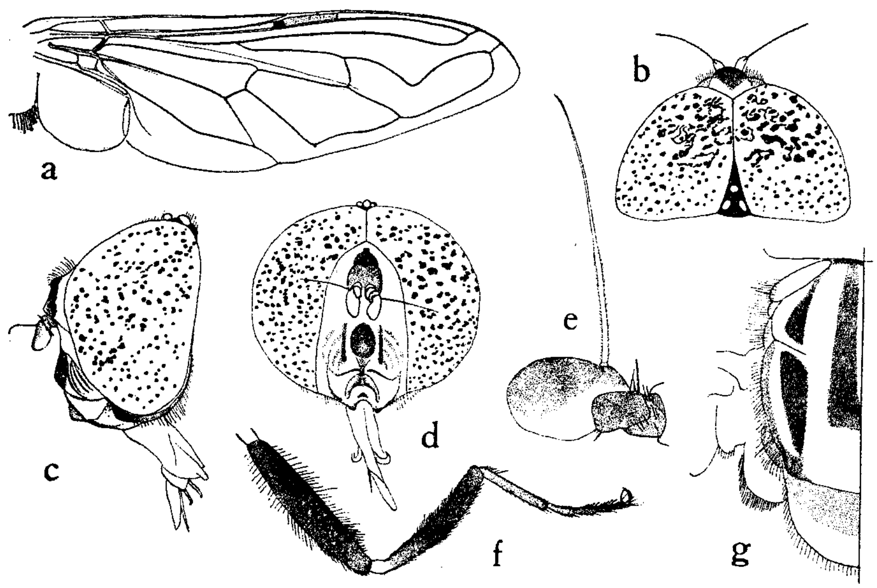



FIGURE 16.—*Lathyrophthalmus viridescens,* male: **a,** right wing; **b,** head, dorsal view; **c,** head, lateral view; **d,** head, frontal view; **e,** antenna, inner side; **f,** hind leg, outer side; **g,** thorax, dorsal view.

shining black, along eye margins grayish dusted and blackish pubescent; lunule shining brownish black with anterior margin yellow, without longitudinal median sulcus; vertical area as long as connected line of eyes, rather narrow, black but obscured by a grayish dust except for shining, well-elevated, ocellar triangle, latter with comparatively large, equidistant ocelli. Face fully one-third as wide as head, hardly widened beneath, densely covered with a gray dust, except rather large central knob and upper mouth edge, latter shining black, on both sides of central knob a pair of blackish stripes and about four faint grooves obliquely beneath these stripes, and a sinuate transverse groove just above upper mouth edge; epistoma dull brown; postgena shining brownish black. Back of head well hollowed, orbits quite sunken but lower parts very slightly expanded, black but entirely obscured by a whitish dust and covered with fine whitish pubescence which becomes long beneath. Eyes with blackish spots all over,

less numerous and more isolated and roundish on lower part, but more numerous and irregularly coalescing on upper part, quite bare; in profile somewhat semicircular, anterior margin more or less evenly rounded and posterior margin nearly straight, nearly 1.5 times as high as wide. Antennae placed just beneath middle of eye, rather small, dull orange yellow but darkened about base and dorsal half of segment 3; two basal segments furnished with some tiny black bristles; segment 3 nearly two-thirds as wide as long, with apex evenly rounded, there are no distinct sensoria; arista yellowish but becoming blackish apically, practically bare.

Mesonotum a little longer than wide, densely covered with a yellowish-gray dust and with erect yellowish pubescence, but on posterior half mostly erect blackish pubescence; two pairs of black longitudinal stripes, outer pair pointed at both ends and distinctly interrupted at transverse suture, almost extending from anterior margin to posterior margin, inner pair placed very near to each other, extending from anterior margin to far before posterior margin and uniting at posterior ends, and slightly covered with a yellowish-gray dust, besides these stripes there is a pair of narrow, yellowish-gray dusted stripes along lateral margins from transverse suture to shining black postalar calli; humeri brownish, obscured by a whitish dust and with some brownish hairs; scutellum twice as wide as long, waxy orange-yellow, when seen from above shining black except posterior margin, practically bare but on posterior border distinct yellowish pubescence. Pleura somewhat shining greenish black, propleuron brownish, moderately covered with a grayish dust and clothed with tawny-white pubescence, mesopleuron and pteropleuron with abundant long yellowish-white hairs; first and second stigmae well furnished with fine yellow fringes.

Abdomen a little longer than thorax, shining light reddish yellow, clothed with fine erect white pubescence; segment 2 with anterior margin black, along posterior border an indefinite blackish band, pubescence on posterior band and lateral borders black, and at anterior corners conspicuously long; segment 3 more brownish, with black pubescence at posterior corners; segment 4 at posterior half blackish, posterior and lateral borders clothed with long, almost entirely black hairs; hypopygium shining black, with yellowish hairs.

Wing a little shorter than thorax and abdomen taken together, nearly 3.3 times as long as wide, pellucid, but base and distally on front part hardly yellowish; stigma yellowish, with only base blackish; r-m beyond middle of discal cell which has a very short spur at posterior angle; spurious vein extending just beyond r-m; 1 A very short; $R_{4+5}$ somewhat triangularly looped into $R_5$ cell. Squamae grayish, but with basal half yellowish, fringe of anterior one brownish gray and of posterior one orange yellow; halter yellowish.

Front leg shortest, with broad metatarsus; femur dull black with apex yellowish, clothed with a blackish pubescence which becomes longer on outer and lower sides; tibia brownish, with basal third light yellow, clothed with a blackish pubescence which becomes longer on outer side; tarsus about two-thirds as long as tibia, orange yellow, clothed with some black pubescence on dorsal side, other segment nearly as long as two following segments taken together. Mid leg rather slender; femur black with apex yellowish, clothed with a blackish pubescence which becomes longer (but shorter than on front femur) on outer and lower sides; tibia brown with basal half light yellowish, pubescence on yellowish part white and on rest black, which becomes longer on outer side; tarsus a little shorter than tibia, light yellowish but from tip of segment 1 to apical segment more or less darkened, segment 1 nearly as long as three following segments taken together, clothed with white pubescence intermixed sparsely with black and with short black bristles at apex, remaining segments with black pubescence on dorsal side. Hind femur more or less shining black with apical part brown, clothed with comparatively long black pubescence which becomes dense and oblique on dorsum just beyond middle, white on venter of basal half and conspicuously dense on venter of apical third; hind tibia distinctly shorter than in femur, slightly curved, cicatrix after middle, brown with the base light yellow, rather densely clothed with black pubescence which is almost equal in length all over; hind tarsus as long as

tibia, orange yellow but darker in four apical segments, dorsum with black pubescence, segment 1 a little shorter than remaining segments taken together, on underside, dense orange-yellow setae which become distinctly longer toward base. Claws shining black; pulvilli yellow.

Length 13 mm.; wing length 10 mm.

Holotype, male (US 66523), Angaur I., Palau Is., May 1954, Beardsley.

DISTRIBUTION: Caroline Is. (Palau).

The present species is rather near *L. arvorum* Fabricius, but it is quite distinct in coloration.

## 20. **Lathyrophthalmus suavissimus** (Walker). (Figure 17.)

*Eristalis suavissima* Walker, 1859, Linn. Soc. London, Proc. **3**: 95.

*Male:* Head slightly broader than thorax, nearly 1.6 times as wide as long and very slightly narrower than high, semicircular when seen from above. Eyes occupying about half of frons in middle; vertical triangle rather small, well elevated, black with black pubescence; ocelli large, orange yellow, very prominent; frontal triangle covered with dense orange-yellow tomentum and rather sparse black pubescence, above lunule is a minute, bare round callus; lunule rather large, triangular, with a median longitudinal sulcus, shining waxy yellow. Face rather short, about as wide as long, scarcely broadened beneath, covered with a dense orange-yellow tomentum and very short yellowish pubescence, sides of antennal bases with a pair of pale-brown triangular spots; central knob small, bare, somewhat shining brownish yellow; gena rather prominent, brownish; mouth edge broadly divided from face by a distinct transverse sinuate sulcus. Back of head conspicuously hollowed, without exposed orbits, black, obscured by a grayish dust, with pale-yellow pubescence on lower part, fading away behind middle of eyes, a few short brownish hairs behind vertex. Eyes with irregular black spots, facets on upper half large and with rather sparse fine yellowish pubescence, on lower half small and quite bare; in profile more or less triangular with broadly rounded lower angle, dorsoanterior margin almost straight, posterior margin slightly convex and anteroventral margin rather convex. Antenna small, light reddish yellow, dorsal margin of segment 3 black; segment 3 oval, distinctly longer than wide, on inside a sensorial slit near ventral margin; arista bare, brown.

Mesonotum about twice as long as wide, densely covered with orange-yellow dust and minute black pubescence, with two pairs of very conspicuous dull-black, moderately broad stripes, inner pair separated by a very narrow median line and not reaching hind margin, outer pair narrowed behind and extending from behind humeral calli to posterior margin, both pairs united along anterior margin; humeral calli covered with orange-yellow dust, and with long brown hairs at outer part; scutellum shining waxy yellow with more or less darkened central part, covered with black pubescence, posterior margin very narrowly marginate and with one row of rather long brown hairs; postphragma black. Pleura dull-shining black, slightly covered with a gray dust; mesopleuron and upper half of sternopleuron densely covered with yellowish dust and with rather long brownish-yellow pubescence; pteropleuron brownish, with very long brownish-yellow hairs especially at upper half; upper half of metapleuron covered with dense orange-yellow dust and clothed with very long, dense, orange-yellow hairs; hypopleuron covered with a grayish-white dust; fringes of first stigma orange yellow, but of second stigma whitish.

Abdomen a little longer than thorax, almost black; segment 1 pale yellow, median posterior part rather whitish; segment 2 with conspicuously large, lateral orange-yellow patches practically filling whole surface except the $\wedge$-shaped band and lateral spots, this band being same width, placed along posterior margin at lateral one-third and just behind anterior margin in middle; segment 3 as long as preceding one, with

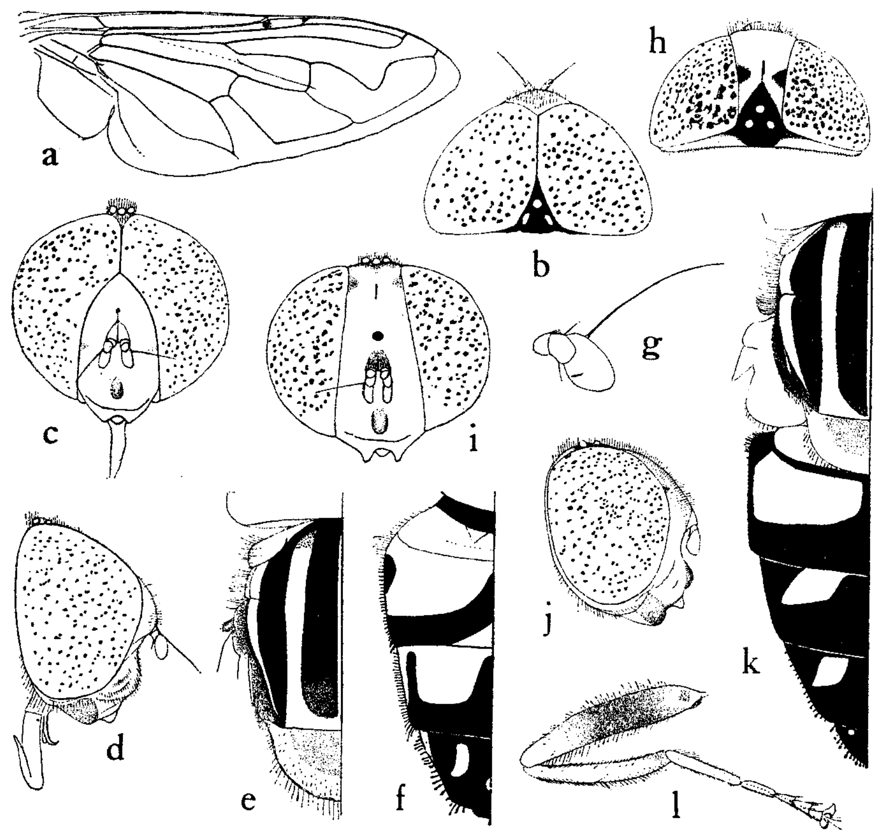



FIGURE 17.—*Lathyrophthalmus suavissimus*. **a-g**, male: *a*, right wing; *b*, head, dorsal view; *c*, head, frontal view; *d*, head, lateral view; *e*, thorax, dorsal view; *f*, abdomen, dorsal view; *g*, antenna, inner side. **h-l**, female: *h*, head, dorsal view; *i*, head, frontal view; *j*, head, lateral view; *k*, thorax and abdomen, dorsal view; *l*, hind leg, outer side.

a pair of large orange-yellow subquadrate spots and longitudinal, extremely lateral spots, these spots continuous along anterior margin; segment 4 distinctly shorter than third, with a pair of small orange-yellow, kidney-shaped spots, a very small median dot and lateral reddish-brown parts; hypopygium shining black; pubescence on black parts black, on yellowish spots yellow. Underside shining yellowish, with a narrow blackish median and a lateral stripe, former broadened toward genitalia and latter interrupted at joints of segments.

Wing glassy hyaline, with rather small pterostigma which is black at both ends with grayish microscopical pubescence along anterior margin; spurious vein only distinct at apical half and reaching to just beyond r-m; 1 A not developed except at extreme base; r-m just after middle of discal cell; squamae blackish, with yellow fringe, but upper one with grayish fringe, lower one orange yellow at basal half.

Legs rather slender, brownish yellow; front femur quite orange yellow at base and apex, with rather long blackish hairs especially on outer side; front tibia pale

yellow, but gradually darkened toward tip, pubescence mostly blackish, but becoming yellowish white at base; front tarsus nearly two-thirds as long as tibia, rather flattened; middle leg colored and pubescent as front leg, but the tarsus paler and about as long as tibia; hind femur slightly thickened, blackish brown, both ends being reddish yellow, at outer base a black spot of numerous microscopical setae, covered with long pale yellow hairs which become black and somewhat bristly on apical third of under side; hind tibia nearly four-fifths as long as femur, orange yellow with base yellowish white, covered with black pubescence; hind tarsus distinctly longer than tibia, pale yellow with apical two segments more or less darkened, segment 1 as long as three following segments taken together.

*Female:* Frons at vertex 4.8 times as wide as head and gradually broadened toward level of antennae, where it is slightly more than one-third width of head, densely covered with grayish-yellow dust and erect black pubescence; just in front of large, black, vertical triangle one pair of velvety black triangular lateral spots, between those spots a short black longitudinal median streak, and one small blackish-brown, dotlike callus just above rather large triangular, shining brown lunule, latter has a distinct median longitudinal sulcus and becomes reddish yellow at anterior margin. Face slightly broadened beneath, densely covered with a grayish-yellow dust and short pubescence, with a conspicuous, oblong, shining, brownish-yellow central knob; gena shining castaneous brown; epistoma brownish; postgena black. Eyes quite bare, blackish dots much more irregular. Abdomen shining black except segment 1, spots well defined, second pair smaller than in male while third pair larger; segment 5 with a pair of yellow dots along base; venter much more blackish than in male.

Length 11-12 mm.; wing length 8-8.2 mm.

DISTRIBUTION: Aru, New Guinea, Micronesia.

PALAU. BABELTHUAP: five, Ngerehelong, May 1957, one, Ngardok, May 1957, one, Ngarsung, Airai, May 1957, one, Ngiwal, May 1957; all by Sabrosky. KOROR: one, May 1957, Sabrosky; three, Aug. 1952, Beardsley; one, Feb. 1953, at light, Beardsley; one, northeast corner of Koror, July 1946, Townes. ANGUAR: one, Dec. 1949; one, Jan. 1953, Beardsley.

### 21. **Lathyrophthalmus arvorum** (Fabricius).

*Syrphus arvorum* Fabricius, 1787, Mant. Ins., 335.
*Syrphus quadrilineatus* Fabricius, 1787, Ibid. 336.
*Musca tranquebarica* Gmelin, 1790, Syst. Nat. **5**: 2870.
*Eristalis fulvipes* Macquart, 1846, Dipt. Exot., Suppl. **1**: 128.
*Eristalis anticetus* Walker, 1849, List Dipt. Brit. Mus. **3**: 624.
*Eristalis antidotus* Walker, 1849, Ibid. **3**: 626.
*Eristalis okinawensis* Matsumura, 1915, Thousand Insects of Japan, Add. **2**: 261.

*Male:* Face and gena pale yellow with yellow pile. Central knob small, bare and orangish in center. Eye with brown spots. Antenna small, pale reddish yellow.

Mesonotum bright yellow pollinose with two pairs of large brown stripes, inner pair well separated anteriorly, apically brown color changes to orange, outer pair faintly interrupted at transverse suture.

Abdominal segment 1 yellow; segments 2 and 3 yellow with brown posterior band, band with median, anterior, acute projection; segment 4 brown to yellowish brown, with pair of oblique, yellow pollinose bands that project toward each other but do not meet on midline, inner corners tapering.

and slightly narrowed above and below, conspicuously concave below antennae, central knob rather large and prominent, with a small blunt point on each side of mouth opening; epistoma in profile triangularly produced; gena not produced below eye. Back of head well hollowed, blackish white dusted; orbits linearly developed about lower half and with white pile. Eyes yellowish black, very large, upper facets larger than lower ones; in profile somewhat triangular with each angle moderately rounded, anterodorsal margin almost straight and two other margins slightly convex. Antenna very short, blackish; segment 2 on inside about as long as wide, subquadrate; segment 3 sometimes brownish yellow, 1.4 times as long as preceding segments taken together, a little longer than wide, narrowed toward round apex, on inside a rather distinct, large sensorial groove near lower base; arista yellow, bare, more than twice as long as antenna proper.

Mesonotum shining violet blue, nearly as wide as long, transverse suture rather deep, densely clothed with erect blackish setae; humeri with blackish pile about outer half; notopleuron densely clothed with blackish pile; postalar calli without pile; scutellum comparatively small, color and pubescence as in mesonotum, without pile or bristly hair. Pleura shining violet blue; mesopleuron and pteropleuron with long blackish hairs; first and second stigma margined with brownish yellow.

Abdomen a little shorter than head and thorax taken together, broader than thorax, but gradually narrowed apically; segments 1 and 2 shining violet blue, clothed with long erect blackish setae which become shorter at about posterior half of segment 2; segment 3 a little shorter than preceding one, shining brownish yellow with violet-blue base, densely covered with very short erect blackish setae; segment 4 distinctly shorter than preceding one, shining brownish yellow, clothed with blackish setae which are longer than those on segment 3; hypopygium brownish yellow and violet blue; venter shining violet blue, clothed with blackish, short, rather appressed setae; pleural membrane reddish yellow.

Legs rather slender, purplish black, very slightly shining, with bases of tibiae more or less paler, clothed with short blackish setae; pulvilli yellowish; empodium very short and bristlelike, yellow; claws blackish.

Wing about 3.1 times as long as wide, tip rather pointed; $R_{4+5}$ deeply looped downward; r-m distinctly convex, placed just beyond middle of discal cell; 2 A conspicuously curved downwards; 1 A extending to just below lower corner of basal cell; $R_1$ cell closed, with rather long petiole; alulae comparatively large, a little longer than wide, almost quadrate. Wings blackish brown at anterior half and light yellowish pellucid at posterior half; basal cell almost always hyaline in middle longitudinally.

*Female:* Frons nearly one-twelfth times as wide as head, slightly broadened forward, densely clothed with a short erect blackish pubescence, frontal process prominent, with comparatively large lunule shining greenish black and with median longitudinal sulcus; vertical triangle well elevated, furnished with blackish, longer pubescence behind ocelli which are smaller and darker than those in male. Face almost always very slightly broadened beneath, with straight lateral margins, lateral dusted parts shorter and narrower than in male, in profile almost not hollowed below central knob and more produced than in male. Back of head with a very narrow but distinct orbital portion throughout. Eye in profile short oval, with anterior angle very large and rounded. Segment 3 of abdomen colored as preceding, but with lateral and posterior margins shining brownish yellow; segments 4 and 5 shining brownish yellow.

Length 18-21 mm.; wing length 16-19 mm.

DISTRIBUTION: Malay, New Guinea, Philippines, Micronesia.

PALAU. BABELTHUAP: Three, Melekeiok, mangroves, May 1957, Sabrosky; one, Ngaremlengui, June 1957, Sabrosky. KOROR: One, Apr. 1953, Beardsley. PELELIU: One, 1935, Yoshino.

## Genus **Dissoptera** Edwards

*Dissoptera* Edwards, 1915, Zool. Soc. Lond., Trans. 20 (13) : 410.

Medium-sized peculiar scaly flies. Head a little wider than thorax; eyes bare, widely dichoptic in both sexes; face concave, without tubercle; occiput with long, curved, scalelike hairs along orbits. Antennae short; segment 3 round, with bare, rather long, arista. Mesonotum covered with short scales intermixed with ordinary erect pubescence; humeri and pleurae tomentose; scutellum clothed with hairs and scales as in mesonotum. Abdomen subconical or subcylindrical, densely pilose and rather sparsely scaly. Anterior cross vein rather far before middle of discal cell; marginal cell closed with distinct petiole; third vein shallowly looped, ending just before wing tip.

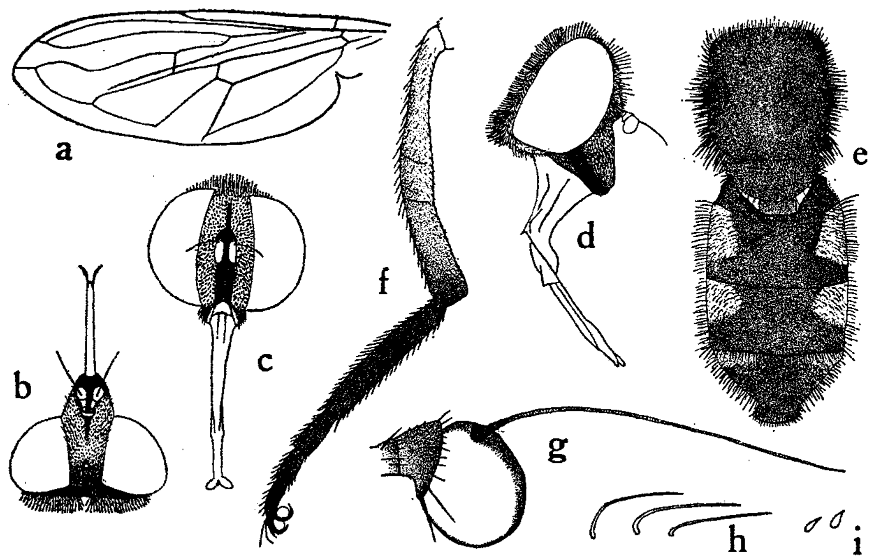



FIGURE 19.—*Dissoptera clarkei,* male: **a,** left wing; **b,** head, dorsal view; **c,** head, frontal view; **d,** head, lateral view; **e,** thorax and abdomen, dorsal view; **f,** hind leg, outer side; **g,** antenna, outer side; **h,** scales along posterior margin of head, greatly magnified; **i,** scales on dorsal parts of body, greatly magnified.

### 24. **Dissoptera clarkei** Shiraki, n. sp. (fig. 19).

*Male:* Head distinctly wider than thorax, fully 1.3 times as wide as long and fully 1.2 times as wide as high. Frons nearly one-fourth width of head, moderately broadened forward with rather straight lateral margins, black, densely covered with short, orange-yellow scales and many erect black setae; lunule narrow, bandlike, yellowish brown; vertex slightly narrower than frons, with rather dense, erect, black setae, without scales, ocellar triangle not conspicuous with light-colored, equidistant ocelli. Face hollowed just below antennae, and then obliquely produced forward but not below eye, nearly to level of underside of eye, without facial tubercle, densely covered with long, dark, yellowish-brown scales except median third and lower lateral sides from the lower-anterior angle of eyes to apex shining black; epistoma light yellow, rather membranous; cheeks more or less swollen, yellowish dusted. Back of head slightly

hollowed, black, orbital area densely furnished with long, scaly, yellowish-brown hairs. Eye comparatively large, in profile nearly oval, posterior margin rather straight, anterior margin well convex, lower posterior angle nearly reaching underside of gena. Proboscis narrow and long, blackish with rather slender labella. Antenna just above middle of eye, mostly yellowish brown; segment 2 less than half length of 3, blackish; segment 3 nearly round, compressed, as wide as long, dorsal border blackish, arista blackish and bare.

Thorax (including scutellum) nearly 1.5 times as long as wide, black, densely covered with short, orange-yellow scales intermixed with erect black setae on dorsum; mesonotum slightly longer than wide, anterior border with long, scaly, orange-yellow hairs and lateral borders densely covered with longer thick orange-yellow pile intermixed with some black bristly hairs; humeri slightly tomentose, covered with rather dense, longer, orange-yellow setae and with two or three black bristly hairs; scutellum semicircular, laterobasal area with many long, orange-yellow setae and along posterior margin some fine, black, bristly hairs; pleura black, slightly tomentose, mesopleuron furnished with very long, dense, orange-yellow hairs; anterior stigma circular with dense minute light-yellow pubescence, posterior stigma transverse, rather long, with whitish posterior margin, quite bare.

Abdomen distinctly shorter than head and thorax together, broad at base, black, with three pairs of orange-yellow lateral spots, covered with short, orange-yellow scales which are less dense than those on mesonotum, on yellow parts also orange-yellow setae which are only on anterior half of each black portion; segment 1 without scales but yellowish pubescence on black area, along metanotum whitish, median one-third blackish brown; segments 2 to 4 with long orange-yellow setae along lateral margins, yellow spots as shown in figure; along posterior margin of segment 4 many long black bristly hairs, on hind corners of segments 2 and 3 also some similar hairs, and along posterior margin of segment 3 many shorter ones; hypopygium conspicuous, black, densely covered with orange-yellow elongate scales; genitalia large and brown.

Wing shorter than body, three times as long as wide, toward apex more or less smoky, pterostigma light yellowish; $R_1$ cell distinctly petiolate; loop of $R_{4+5}$ shallow; vena spuria conspicuous, but 1 A obsolete.

Legs moderate in length, brownish yellow; two anterior pairs of femora distinctly thickened at base, on outer side many long yellowish hairs; front femur with some fine black bristly hairs at median under side; two anterior pairs of tibiae brownish except basal third, setae mostly black; two anterior pairs of tarsi blackish, with black setae; hind femur slightly longer than tibia, nearly same in width throughout, rather sparsely covered with very short, mostly black setae which become somewhat longer on under side; hind tibia after middle slightly bent, well covered with black short setae, darkened apically; hind tarsus black, covered with black setae, first segment 0.6 times as long as tibia and distinctly longer than remaining segments, moderately narrowed apically; all claws black.

Length 9.2 mm.; wing length 8 mm.

*Female:* Quite similar to male, abdominal segment 5 densely covered with erect, brownish-yellow scales and at posterior angles many erect black bristly hairs.

Length 8.2-10.8 mm.; wing length 8-9.5 mm.

Holotype, male (US 66524), Wakap, Kusaie, 490 m., Apr. 27, 1953, Clarke; allotype, female (US), Mwot, Kusaie, Apr. 7, 1953. Paratypes: Female, same as allotype; eight females, Malem R., Kusaie, 30 m., Mar. 1, 1953, Clarke; female, Mutunlik, Kusaie, 22 m., Mar. 30, 1953, Clarke.

DISTRIBUTION: Caroline Is. (Kusaie).

This species is near *D. pollinosa* Edwards, but differs in the coloration and size of the yellowish spots on the abdomen, in the scales on the abdomen, and other characters.

## 25. Dissoptera gressitti Shiraki, n. sp. (fig. 20).

*Male:* Medium-sized, rather elongate blackish-white scaly species. Head black, distinctly wider than thorax, 1.8 times as wide as long and nearly 1.3 times as wide as high. Frons nearly one-fifth as wide as head, slightly broadened forward with rather straight lateral margin, very slightly and narrowly produced just in front of lunule, with many short white scales intermixed with erect, more or less dense, black setae except apical process, and along apical lateral margins some white setae; vertex without scales but covered with many shorter erect black setae, no distinct ocellar triangle, ocelli brown and equidistant; lunule shining brownish black, bandlike. Face a little longer than wide, almost parallel-sided, under antennal bases obtusely hollowed and then straightly and more or less obliquely produced forward, slightly yellowish gray tomentose and rather densely white scalose, except bare median longitudinal keel-like

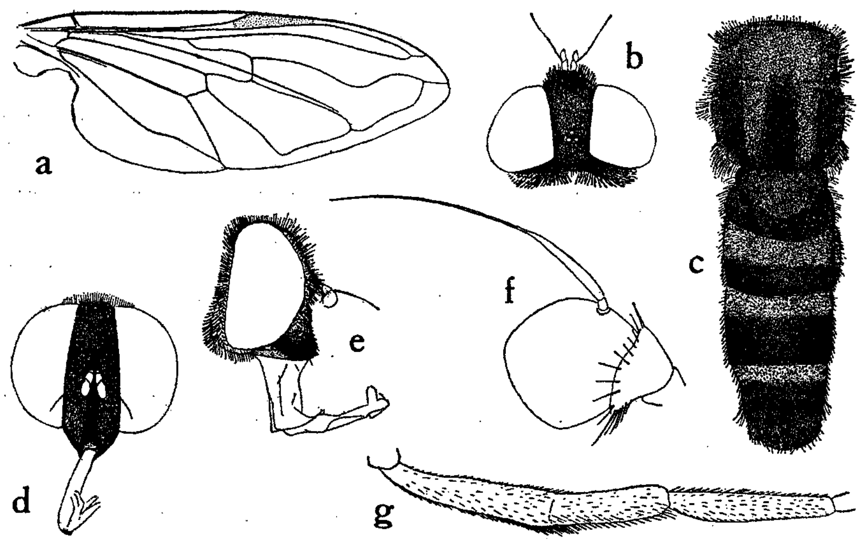



FIGURE 20.—*Dissoptera gressitti*, male: **a**, right wing; **b**, head, dorsal view; **c**, thorax and abdomen, dorsal view; **d**, head, frontal view; **e**, head, lateral view; **f**, antenna, outer side; **g**, hind tibia and metatarsus.

elevation; gena slightly yellowish gray tomentose, but quite bare from lower apical margin of eyes to epistomal margin; epistoma very short, yellowish brown. Back of head slightly concave, along orbits abundant long white scaly hairs extending to postgena, where mostly covered with whitish hairs intermixed with a few black setae. Eye in profile rather semicircular with straight posterior margin, upper angle more or less broader than lower angle. Antenna dark brown; segment 2 along outer apical margin with a row of black bristly hairs which become longer and denser at lower corner; segment 3 more or less quadrangular, about as wide as long, upper and apical borders more darkened; arista black, 1.6 times as long as antenna, basal third conspicuously thickened, quite bare.

Mesonotum distinctly longer than wide, velvety black, covered with erect black setae, along anterior border many white scaly hairs which are straight and never curved at tips, along lateral borders are some black bristly hairs, and on posterior

margin some white setae; prescutum with white scales which extend into two broad, not sharply defined, longitudinal stripes on scutum; humeri covered with long white hairs; prealar calli conspicuously covered with dense, outwardly directed, white, more or less scaly hairs; postalar calli along lower margin with dense, longer white setae, outwardly and postero-obliquely directed; scutellum semicircular, nearly twice as wide as long, covered with white scales intermixed with numerous erect black setae, along posterior margin some black bristly hairs, at basal corners with some long white hairs. Pleura velvety brownish black; mesopleuron and sternopleuron densely covered with very long, white hairs; pteropleuron with a large, radiating bunch of long, yellowish-white pile; metapleuron distinctly covered with yellowish-white dust; hypopleuron covered with fine, erect, yellowish setae; first stigma nearly slitlike, second stigma circular with a median slit, yellowish brown, with a very short brush at the upper area.

Abdomen a little shorter than head and thorax together, rather elongate, narrowed apically, velvety black; first segment on lateral third with long, erect, white, scaly hairs; second segment on basal half with long, erect, white scaly hairs, except median one-third which is densely covered with white scales, on remaining area very dense erect black setae which become bristly along posterior margin; hypopygium conspicuous, black, covered with whitish scales and setae, genitalia brownish black. Underside of abdomen blackish.

Wing a little shorter than body, nearly 2.9 times as long as wide, moderately narrowed apically, hyaline but very faintly smoky about apical half, with yellowish-brown pterostigma.

Legs dull black, with base of tibiae yellowish; fore and mid femora distinctly thickened at basal third, along posteroventral side numerous long blackish hairs intermixed with some white hairs; hind femur hardly narrowed apically, along basal third a few long blackish bristly hairs; hind tibia nearly as long as the femur, moderately bent just after middle, setae on this curve distinctly longer than others; hind metatarsus nearly 0.56 times as long as femur and distinctly longer than four following segments together; claws brownish black, pulvilli yellowish brown.

Length 10 mm.; wing length 9 mm.

*Female:* Same as male, but abdomen comparatively broad and shorter, scales on median part of segment 2 orange yellow, segment 5 small and black pubescent; base of tibiae brownish black.

Length 9.5 mm.; wing length 8.8 mm.

Holotype, male (US 66525), Southeast Nanpohnmal, Ponape, Jan. 7, 1953, Gressitt; allotype, female (US), north slope of Mt. Temwetemwensekir (Tamatanansakir), Ponape, Jan. 19, 1953, Clarke.

DISTRIBUTION: Caroline Is. (Ponape).

### 26. **Dissoptera yapensis** Shiraki, n. sp. (fig. 21).

*Male:* Rather small, elongate species with black and light-yellow scales. Head conspicuously broader than thorax, semispherical. Frons nearly one-fifth width of head, distinctly broadened anteriorly, with slightly incurved lateral margins, mostly sparsely covered with yellowish-white scales intermixed with numerous erect black setae, but on anterolateral parts with dense, long, yellowish-white, scaly hairs; vertex bare of scales but with many erect black setae which are almost absent on ocellar portion; lunule bandlike, shining brownish black, with a distinct longitudinal sulcus which extends for a short distance into prefrons. Face quite parallel-sided, nearly twice as long as wide, densely covered with very light yellowish-white depressed hairs except median longitudinal stripe which occupies one-third of facial width, moderately hollowed below antennal bases and then straight and obliquely produced forward, lower lateral portion along lateral oral margin shining black; epistoma yellowish brown. Back of head very slightly hollowed, black, along orbits dense, long, pale-yellowish

white scaly hairs become long hairs on postgena. Eye in profile nearly semicircular, with posterior margin distinctly and anterior margin rather uniformly curved. Antenna rather evenly brownish black; segment 2 with two or three long black bristles at lower angle and a few short bristly hairs on upper inside portion; segment 3 nearly as long as wide, almost circular; arista blackish, with basal fourth moderately thickened and yellowish.

Mesonotum quite quadrate, nearly 1.4 times as long as wide, densely covered with light yellowish scales, except humeri and postalar calli, both of latter velvety brownish and with long, light-yellowish, pointed, scaly hairs, along anterior border long, light-yellowish, scaly hairs and on dorsum of bases of wings similar, but pointed, scaly hairs. Scutellum semicircular, fully twice as wide as long, scales as in mesonotum, at basal angles many long, pointed, light-yellowish, scaly hairs directed anterolaterally,

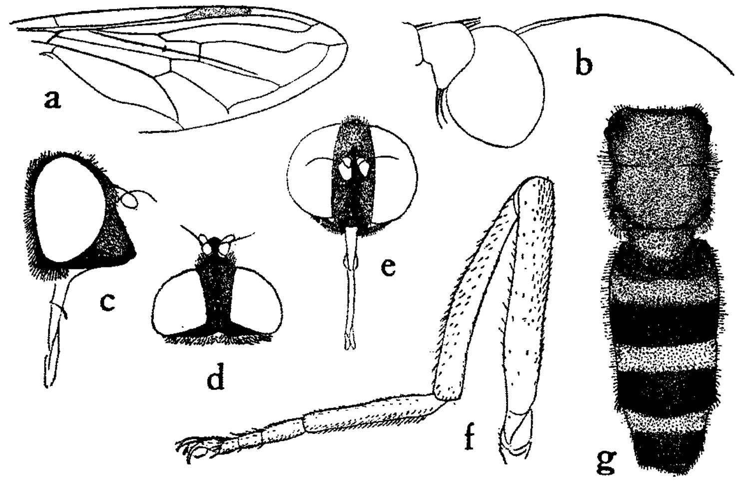



FIGURE 21.—*Dissoptera yapensis,* male: **a**, right wing; **b**, antenna, inner side; **c**, head, lateral view; **d**, head, dorsal view; **e**, head, frontal view; **f**, hind leg, outer side; **g**, thorax and abdomen, dorsal view.

along posterior margin some fine black bristly hairs. Pleura velvety brownish black; mesopleuron with numerous long, more or less curled, light-yellow, scaly hairs; pteropleuron with a large brush of mostly upwardly directed, long, light-yellowish hairs; first stigma vertically elongate, median part densely covered with minute light-brownish setae; second stigma oval in shape, light brownish, margin with fine setae.

Abdomen hardly broader than thorax, nearly as long as head and thorax united, segments 2 to 4 each with a rather broad, light-yellowish scaly basal band furnished at side with similarly colored long hairs, hairs extend posteriorly along lateral borders of segment 2, replaced on segment 3 with black bristly hairs; segment 4 with evenly scaly basal band, rest entirely covered with dense, short, erect, brownish-black setae; posterior half of segments 2 and 3 covered with dense short erect brownish-black setae on large median part; hypopygium covered with a grayish dust and fine, light-colored setae, genitalia brown.

Wing more or less fumose but basal part quite hyaline, with light-brownish pterostigma, nearly three times as long as wide.

Legs blackish, with apical half of femora and basal third of tibiae reddish yellow; fore and mid femora with long, light-yellowish hairs on posterior (outer) side, those hairs on fore femur rather sparse; hind femur brownish at apical half, rather sparsely covered with black setae, conspicuously longer hairs along under side; hind tibia very slightly bent, with long hairs; hind metatarsus nearly 0.62 times as long as tibia, longer than remaining segments together; claws black, pulvilli yellowish brown.

Length 8.2 mm.; wing length 7 mm.

*Female:* No distinct differences from male; abdominal tergite 5 with basal band similar to preceding one, apical half with many long, blackish setae.

Holotype, male (US 66526), near Yaptown, Yap, July 14, 1946, Townes; allotype, female (US), Yap, Oct. 1952, Krauss. Female paratype, Ruul Dist., Yap, July-Aug. 1950, Goss; female, Yap, Mar. 28-31, 1954, Beardsley.

DISTRIBUTION: Caroline Is. (Yap).

This species is similar to *D. gressitti,* but distinguished by arrangement of scales and other minor points.

### 27. **Dissoptera palauensis** Shiraki, n. sp. (fig. 22).

A rather elongate, black species, with yellowish-brown scales.

*Male:* Head distinctly broader than thorax, more or less semispherical, nearly 1.2 times as wide as long or high. Frons nearly one-fifth as wide as head, moderately broadened forward with almost straight lateral margins, covered with erect blackish setae and yellowish-brown scales, latter not present on vertical area, becoming whitish and sparse on apical produced area, this area with long white hairs intermixed with black ones; lunule shining brown. Face just below antennae hollowed and then obliquely produced forward but not conspicuously below eyes, shining but whitish tomentose and pubescent at lateral parts of basal half. Back of head moderately hollowed, along orbits with dense, straight (not curved at tip), yellowish-brown, scaly hairs which become whitish ventrally, genal areas with abundant, long, whitish hairs. Eyes comparatively large, somewhat distinctly narrowed posteroventrally. Antenna dark brown; segment 3 very slightly longer than wide, evenly rounded apically; arista blackish, nearly one-fourth of base distinctly thickened and more or less yellowish.

Mesonotum subquadrate, distinctly longer than wide, densely covered with yellowish-brown scales and short, erect, black setae, latter becoming longer at lateral borders, between humeri a transverse band composed of some light-colored, scaly hairs; humeral calli with many long, yellowish hairs intermixed with a few black ones; notopleural calli with yellowish hairs and a few black bristly hairs; postalar calli with longer, yellowish hairs along outer border; scutellum semicircular, 2.5 times as wide as long, densely covered with yellowish-brown scales and rather long, erect, black setae, at basal angles many long, anterolaterally directed, yellowish, scaly hairs and along posterior margin many long, black, bristly hairs.

Abdomen distinctly shorter than head and thorax together, slightly broader than thorax, moderately narrowed toward apex; segment 1 sparsely covered with fine whitish setae along posterior border, at lateral borders there are some black setae; segments 2 to 4 each with basal band consisting of yellowish-brown scales at median anterior area, of yellowish scales at median remaining area and of whitish hairs at lateral borders, remaining parts covered with dense black depressed setae which become more or less erect on segment 2; segments 3 and 4 each with a conspicuous row of posteriorly directed, oblique, black, bristly setae along lateral margins of black portion; hypopygium comparatively small, sparsely covered with yellowish setae.

Wing a little longer than thorax and abdomen together, comparatively narrow, three times as long as wide, apical half slightly fumose, pterostigma yellowish brown.

Legs brownish black, apical third of fore and mid femora and basal third of fore and mid tibiae more or less light brown; fore and mid femora distinctly thickened at

basal third, posterior borders with long white hairs intermixed with a few black bristly hairs; hind femur very slightly narrowed toward apex, along under side a few black, short, bristly setae; hind tibia slightly bending at apical third, densely covered with black setae on dorsal side; hind metatarsus nearly 0.6 times as long as tibia, under side covered with dense short brownish setae.

Length 9 mm.; wing length 7.8 mm.

*Female:* Same as male, but scales, especially on abdomen, more reddish brown, and abdominal segment 5 with scaly basal band on preceding segment. In one specimen (Angaur, Mar. 1954), abdominal basal scaly bands similar to those on male, and the scales of basal bands on segments 4 and 5 entirely white.

Length 10-11.5 mm.; wing length 8.5-9 mm.

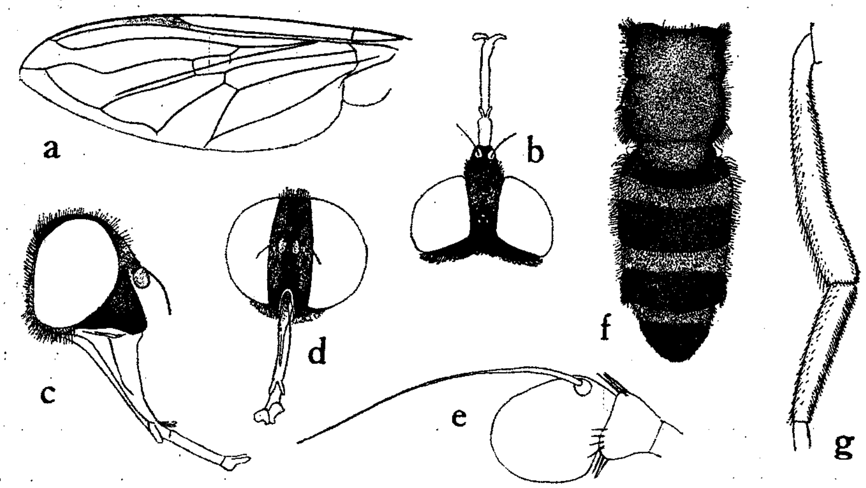



FIGURE 22.—*Dissoptera palauensis*, male: **a**, left wing; **b**, head, dorsal view; **c**, head, lateral view; **d**, head, frontal view; **e**, antenna, outer side; **f**, thorax and abdomen, dorsal view; **g**, hind tibia and metatarsus.

Holotype, male (US 66527), northeast coast of Peleliu, Palau, Jan. 28, 1948, Dybas; allotype, female (US), Angaur, Palau, Feb. 4, 1948, Dybas. Paratypes: Female, same as allotype; female, same, but Mar. 1954, Beardsley; two females, Ngaremlengui, Babelthuap, Palau, June 2, 3, 1957, Sabrosky; female, Ngerimal River, Airai, Babelthuap, May 26, 1957, Sabrosky; male, four females, Ngurukdabel (Urukthapel) I., Palau, Sept. 13, 1953, ex *Messerschmidia,* Beardsley.

DISTRIBUTION: Carolines Is. (Palau).

This new species is near *D. yapensis,* but can be distinguished by the color of the scales and by the posteriorly directed, black setae along the lateral margins of the basal half of the third abdominal segment which in *yapensis* are directed outward.

## Genus **Metasyrphus** Matsumura

*Metasyrphus* Matsumura, 1917, Ent. Mag. Japan 2: 147.

Face gently bulging below, with a low, central knob, usually yellow, often micropubescent. Eyes contiguous in male, separated in female; bare. Antennae short, segment 3 oval. Humeri and area between them without pile; metasternum bare or pubescent, not pilose; scutellum convex and semicircular. Abdomen rather flattened, distinctly marginate at sides, but not rolled over. Wings hyaline, without pattern, villose; third longitudinal vein more or less sinuous; squamae bare on upper surface. Legs slender, hind femur unarmed, hind tibia and tarsus simple.

### 28. **Metasyrphus fasciatus** Shiraki, n. sp. (fig. 23).

*Male:* Head wider than thorax, fully one-half as long as wide and nearly 1.8 times as long as high. Eyes occupying only small space on frons; frontal space short but very broad, posterior eye margins straight, moderately swollen, light yellow, whitish pubescent; vertical triangle long triangular, nearly six times as long as holoptic line, shining black, with black pubescence; ocelli rather small, yellowish, set far apart from each other. Face light yellow, micropubescent, about 0.4 times as wide as head, but moderately narrowed below, slightly hollowed beneath antennae, below which is a rather large, waxy-yellow, central knob, from there face recedes slightly but is again very slightly produced at upper mouth edge, whitish micropubescent except on central longitudinal portion; genae not distinctly produced beneath eyes. Back of head moderately hollowed, dull black, orbits distinctly covered with a whitish tomentum, along hind margin whitish hairs which become yellowish behind vertical triangle and scaly hairs at concave portion of eye. Eyes brownish black, bare, in profile kidney-shaped. Antennae orange yellow, segment 2 conspicuously shorter than 1, more or less brownish, with tiny black bristles on dorsal apex; segment 3 oval, 0.6 times as wide as long, with three irregular sensoria inside; arista very short and bare, on middle of dorsum of segment 3.

Mesonotum aeneous black, with well-defined, yellowish, lateral streaks from black humeri to basal angles of scutellum, whitish pubescent, a little longer than wide; scutellum semicircular, much swollen, waxy yellow, yellowish pubescent; pleura aeneous black, mesopleura and sternopleura each with a whitish callus which has whitish pile, on mesopleural callus, pile is more or less yellowish; second stigma light yellow.

Abdomen a little longer than head and thorax together, oblong, nearly 1.4 times as long as wide, pale yellow with narrow, brownish-black bands; segment 1 shining black; segment 2 with posterior marginal band and median longitudinal streak; segment 3 with only posterior marginal band; band of segment 4 not touching extreme posterior margin and slightly produced forward in middle; segment 5 more or less brownish black, band not touching posterior hind margin (see fig. 23, *g*); hypopygium shining blackish with apical third yellowish; genitalia relatively large and brownish, with slender, uncinate, yellowish cerci.

Wing as long as scutellum and abdomen together, hyaline, with pterostigma light brownish; $R_1$ cell closed at costa; vena spuria and 1 A well developed; squamae whitish, with yellowish margins and long fringes.

Anterior pairs of legs orange yellow, from base of femora to coxae black, outer (posterior) sides of femora with rather long, yellowish pile; hind legs more or less darker, femora black except apical one-fourth dark orange yellow, tarsi brownish black on upper side.

Length 8 mm.; wing length 5 mm.

*Female:* Frons broad, nearly one-fourth as wide as head at vertical portion, conspicuously broadened forward, light yellow with brownish longitudinal median streak, and from just in front of ocellar triangle to occiput shining black; ocellar triangle large and conspicuous, with equidistant yellowish ocelli. Face nearly one-half as wide

as head, very slightly narrowed beneath, central knob relatively broad. Segments 5 and 6 of abdomen entirely yellow, segment 7 blackish with apex yellowish.

Length 8 mm.; wing length 6 mm.

Holotype, male (US 66528), Johnston I., Dec. 9, 1947, K. L. Maehler; allotype, female, Johnston I., Nov. 6, 1946; paratypes, male, female, Johnston I., Nov. 6, 1947, no collector.

DISTRIBUTION: Johnston I.

This species is very near *Syrphus pusillus* Macquart from the Australian Region, but differs in the more produced facial knob, the relatively large frontal process, and the black abdominal bands without longitudinal streak (except on the second segment).

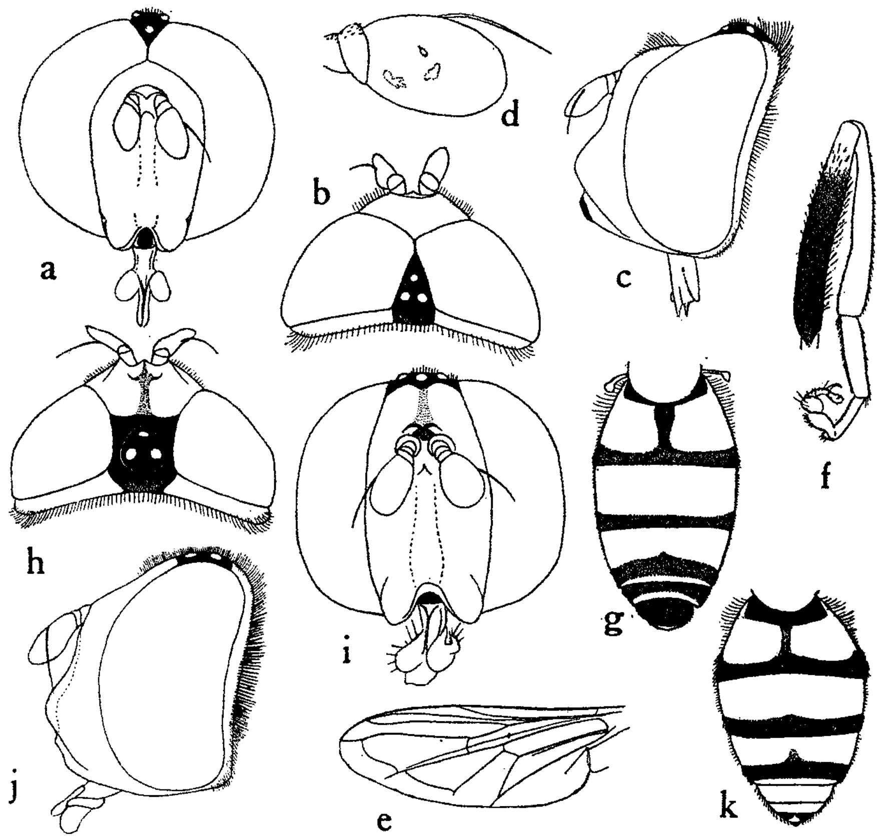



FIGURE 23.—*Metasyrphus fasciatus*. **a-g**, male: *a*, head, frontal view; *b*, head, dorsal view; *c*, head, lateral view; *d*, antenna, inner side; *e*, left wing; *f*, hind leg, outer side; *g*, abdomen, dorsal view. **h-k**, female: *h*, head, dorsal view; *i*, head, frontal view; *j*, head, lateral view; *k*, abdomen, dorsal view.